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THE GERMAN iron trade shows some signs of revival, as we have heretofore noted in our columns. The production of pig iron has been increasing this year, chiefly on account of export demand, but now there appear to be some home orders coming in to stimulate the activity of the furnaces. The trade with the United States is reported to be falling off somewhat, but an increased demand is reported from Holland, and some large shipments of pig iron have recently been made to Belgium. Moreover, a much greater activity is noted in the production of finished iron and steel in Westphalia, and other districts. The trade appears, upon the whole, to have taken a turn for the better, and to be approaching a more satisfactory condition.

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FROM PRESS dispatches we learn that a gift of $1,500,000 has been made to the University of London, by Lord Strathcona, Sir Ernest Cassel, Wernher Beit & Co. and other public-spirited men. The purpose of the gift is the endowment of a scientific college; it is made conditional upon the maintenance of the institution by the London County Council at an annual expenditure of $100,000. The government, so it is said, has promised a suitable site, at South Kensington.

We trust this will mean even more than appears and that the public spirit of the leaders of English finance will prompt them to donate a sum which will give an adequate endowment to an imperial School of Mines, to form an annex of the University of London, in a manner comparable to the schools of mines of Columbia University, of the University of California and of other great institutions of learning in this country. It is a standing disgrace to Great Britain that so little has been done toward providing means for properly training the men who direct the enormous mineral resources of a wirldwide empire.

AN APPROXIMATE statement of the consumption of copper during the present year shows that the trade is in a satisfactory condition, notwithstanding the decrease in exports. The net imports, as shown by the report of the Treasury Department for the five months ending May 31, were considerable, and the production this year has increased probably 10 per cent over that of last year. Nevertheless, the consumption and such exports as have been made, have fully absorbed all supplies. An approximate statement for the five months ending with May is found in the following table in long tons:

Stocks, January 1		65,008
Production, five months		125,079
Net imports		27,491
Total supplies		217,578
Exports, five months	58,702	
Approximate consumption	96,375	
		155,077
Stocks, June 1		62,501

While these figures are not exact, they are, nevertheless, believed to be a close approximation to the actual condition of affairs. This is supported by the well-known fact that there are no considerable stocks of unsold metal to be found anywhere. It will be seen that there has actually been a slight decline in stocks since the first of the year. We may add that some good judges think our estimate of consumption a very conservative one.

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A REMARKABLE CHANGE in the British iron trade is shown by the report recently issued by Connal & Company, Limited, and by the proposal to reorganize that company. The corporation named, with the firm of the same name which preceded it, have for many years carried on the business of storing iron and issuing warrants therefor. Their business was originally confined to the Scotch iron trade, but was later extended to the Cleveland District, when the warrant system was adopted there. At one time, practically all the business in Scotch iron was done through "Connals," and the name was familiar in the iron trade all the world over. The highest point ever reached by the stocks carried by the firm was 1,244,433 tons in 1888. From that point the total fell to 245,258 tons at the close of 1899; while at the end of 1902 there were only 24,000 tons of Scotch pig in the stores. At the present time the Scotch pig warrant has almost disappeared from the trade, and the company proposes to sell a large portion of its property in Glasgow and elsewhere, and to decrease its capital stock accordingly. The change shows that a large proportion of the output of the furnaces is now sold to direct consumers, and to a great extent iron warrants are losing their speculative character. The great growth of pig iron production in the United States and Germany has also had a very important effect upon the British trade. Those countries no longer look to Great Britain for supplies, and their trade is conducted in an entirely different way.

The warrant business still retains a considerable hold, however, in the Cleveland District; while the proportion of business done through the stores was never as large in that district as in Scotland, it was still considerable. The stocks at the end of 1902, al-

though not more than one-third of what was carried a few years ago, was 121,000 tons, and the dealings in warrants have fallen off almost to a corresponding degree. It is a significant fact that most of the outstanding warrants for Cleveland iron are said to be held on American account just now.

Attempts have been made at several times to introduce the warrant system of dealing into the American market, but they have never been successful.

The American Pig Iron Storage Warrant Company, although well organized and having an able manager, never did any considerable trade. An attempt made to introduce warrant dealings on the New York Metal Exchange was a flat failure, and the transactions were never more than nominal.

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A SIBERIAN ENTERPRISE.

Among recent undertakings, in which American capital is involved, mention may be made of the Northeastern Siberian Company, Limited, of St. Petersburg. This company has exploratory rights over an enormous area covering the extreme northeasterly corner of Siberia, projecting into Behring Straits, flanked by the Gulf of Anadir to the south and the Arctic Ocean to the north, a territory as large as the States of Washington, Oregon and Idaho. Sixty per cent of the stock of this Russian company has been purchased by the Northwestern Commercial Company and among the New York men of position who have gone into the enterprise are Messrs. Lyman J. Gage, John I. Waterbury, Clement A. Griscom, W. N. Coler, Herbert L. Griggs, James Ramsey, Thomas J. Hurley, N. W. Harris and others. Operations are to be carried on under a concession which grants not only the exclusive mining rights on the Tchoukotsk Peninsula, but also the entire trading privileges, the salmon fishery, timber, etc., as well as a coal mine at Baron Korf Bay, which is said to be able to supply the Nome District, across Behring Straits, with the fuel hitherto obtained from Vancouver.

This concession has had a chequered career. Col. V. M. Wonlarlarsky, a retired colonel of the Imperial Guard, made similar arrangements with Anglo-American capitalists in 1900, and a joint Anglo-American-cum-Russian expedition was equipped in the summer of that year. The steamer *Sonoma* was chartered, so as to take a number of engineers to the Siberian coast, opposite Cape Nome, with a view to determining whether, as had been stated, the gold-bearing gravels of the Alaskan coast extend across the Straits to the Russian shores. Owing to the divided authority of the leaders of the expedition, there arose serious friction, with what is known in Kentucky as "gun play," and, as a consequence, the actual investigation of the mineral resources was of a most unsatisfactory kind, both as regards scope and conclusiveness. Nothing was found which indicated a repetition of the Nome gold-bearing sands. The *Sonoma* returned with a group of engineers and prospectors most thoroughly disgusted with the outcome of the expedition and loud in expressions of resentment for the arbitrary action of the Russian officials who had accompanied them.

Since then it appears that Col. Wonlarlarsky has been able to organize other exploring parties and during 1902 several landings were effected and depots established on the coast. It is said that prospecting operations during 1902 were successful in discovering quartz lodes containing both gold and silver. The value of these finds is to be proved during the present season.

The story of explorations in this far-away corner of the Asiatic continent is, as will be seen, nothing new, but the present enterprise commands attention because in it are enlisted a group of notable New York capitalists, most of whom have hitherto kept aloof from mining. For this reason we hope that the Northeastern Siberian Company will prove eminently successful. We trust also that the Russian Government will be careful to protect the interests of the American shareholders, and avoid exactions on the part of subordinate officials. Such unfortunate occurrences have happened in the past so often that they threatened to render Siberia an unattractive field for the investment of foreign capital.

⚒

MINING ACTIVITY.

There is good reason to believe that the lack of speculative activity on the Stock Exchange, which has become so marked recently, will continue for the remainder of the present year, at least. It is also apparent that the interest in industrial enterprises has waned of late, on account of the fact that many an investor who was expecting his "ship to come home," has found that vessel water-logged; in fact, to use another simile, a good many energetic gentlemen found the "ground floor" inundated before the elevator got into running order.

However these things be, there is a tendency now among moneyed men to look askance at the stock markets, which have hitherto occupied their attention, and to turn to an industry the yield of which is one of the sure foundations of our national prosperity. It is a fact that men, who are regarded as leaders in finance, and who have hitherto kept clear of mining, are now turning their attention to such matters. It is a good omen. Apart from the capital which they will introduce, for the development of natural resources, their training is such that the business of mining is certain to be improved by their participation.

In the past it has been a not uncommon spectacle to see bankers, merchants and financiers, whose names were synonyms for good sense and careful business methods, take part in the direction of mining enterprises only to lay aside all the precautions which were inseparable from the occupations to which they were accustomed. In this way shrewd men have acted like fools and old experienced hands have played the part of novices. It would be a pity not to profit by the experience of others, and to realize that mining requires all the judgment, care and system which level-headed men give to their ordinary business—and more. To the courageous investor it affords as much profit as any other form of human acivity—and more. If, therefore, the newly awakened interest in mining evinced by men of high character is tempered with the precautions which are usual to such men, then we feel sure there will be a mutual gain to the industry and to the participators in it. One word of advice will not be resented from a JOURNAL which has at heart the best interests of mining. When a business man makes a contract, he employs a lawyer; let him, when he engages in a mining enterprise, use the professional advice needed for this particular business; in other words, let him realize that you get nothing for nothing, and very little for ten cents; therefore, advice which is gratuitous is worth what is paid for it, and the services of a capable engineer are cheap at the comparatively high figure which they bring. You cannot go mining with a shoestring.

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ON THE RAND.

The depression in the Kaffir share market has become accentuated of late by a further drop in quotations; this reflects the weariness of those who have waited so long for a revival of activity. Nor is the despondency on the stock exchange at London without its counterpart at Johannesburg. Only a fraction of the mines are at work, and those which are in operation are short-handed as regards labor.

It must be confessed that the hopes founded on the successful termination of the war have proved no less disappointing than the course of the campaign itself. There was good reason to expect that a great wave of industrial activity would sweep over the gold-fields as soon as peace unloosed the channels of trade. All such sanguine expectations have been shattered again and again. The military restrictions, the new taxation, the disorganization of business—these were all obstacles to be reckoned upon in a country emerging from a long and bitter war, and they were duly overcome. But a bigger barrier to prosperity began to be perceived as soon as the dearth of native laborers became manifest. Every effort has been made to meet this difficulty, by increasing wages, by kinder treatment, by energetic recruiting and by seeking for other sources of supply. Agents have been sent to China to see what can be done by way of indenturing coolies, and satisfactory advices have been received. Investigations have been instituted in other countries possessed of a supply of cheap labor, such as India and Japan. Nothing definite has been accomplished, however, and there still remains the uncertainty as to what restrictions may be placed, by the government of the Transvaal, on any scheme for introducing coolies.

Without a large increase in the number of workmen available for the mines, the gold industry of the Transvaal must continue to languish. Investors already show signs of a desire to realize and get out of securities which have been such a disappointment. We do not wonder that this is so. As compared to 74 productive mines in operation in 1899, before the war, there are now 47 on the active list. This comparison does not include the new enterprises which were about ready to begin production when hostilities interfered. On August 1, 1899, there were 5,970 stamps at work, on May 1, 1903, the number was 3,285. Of the properties which have been enabled to secure enough natives to keep their mills at work, a large number are so short-handed that operations are crippled and the full complement of stamps cannot be supplied. For this reason, almost without exception, the profits per ton are lower than in 1899. This result, it must be remembered, is despite the improvement in general conditions, such as smaller railroad freights, better facilities for getting coal, cheaper dynamite, stores, etc. Most of the mines have to meet the cost of a fully organized staff and a complete administration, these expenses being borne by a tonnage which is less than the milling capacity upon which the outlay for management is based. In order to keep the stamps even partially supplied, there is less effort to send clean ore to the mill. Less sorting is being

done at surface, and underground the dearth of natives has led to an increased use of machine drills, causing more indiscriminate breaking of ore in the stopes. More waste, therefore, has gone to the mill, and consequently this factor also has tended to lower the yield of gold per ton. These adverse circumstances naturally have curtailed the rate of dividends, if they have not, as in some cases, led to an indefinite postponement of them. It is no wonder that the average shareholder has lost his pristine gaiety of heart and begins to exhibit impatience, if not worry.

That these untoward events will hold back the development of the greatest gold mining region in the world is a matter of regret, especially to the mining and metallurgical professions, to whom the Transvaal offers so fine a field of activity. But it is only a postponement. Every mining region is facing labor troubles of some sort. In South Africa the difficulty is more acute and more general than elsewhere, but we shall be surprised if it does not lead to a more thorough solution of the problem than in regions which have not as yet been called upon to face the worst. In the end, therefore, we expect to see the Rand established on a firmer basis of industrial prosperity than has been the case either in the present or the past. But this will require time and patience. Let there be no makeshift, but a solution which will be final. If this is done our friends at Johannesburg will set an example in this matter as in others wherein they have already overcome obstacles to successful development.

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MINING DIVIDENDS.

June was a very good month in the matter of dividends, in fact, the second best this year, the stockholders in 46 companies identified with the mineral industry of the United States having received $15,839,913. This amount has swelled the dividends for the half year ending June 30 to $81,143,951, a very gratifying division of profits for which 135 corporations are responsible; this is especially satisfactory considering the fluctuations in copper, silver and other important products. These dividends have gone not only to Americans, but a substantial amount has also been distributed among foreigners, particularly British investors.

The largest dividend-payers have been the combinations, but, as their capitalization is enormous, the annual rate is necessarily smaller—usually 7 per cent on preferred shares and occasionally 4 or 5 per cent on the common—than the independent concerns, among which the gold and copper mines yield the highest percentage. A fact worthy of favorable comment is the progressive management of low-grade mines, which, by economical treatment of large quantities of ore, have succeeded in winning profits from material that not many years ago would have been considered waste.

Fifty-two industrial companies distributed $65,477,957 out of profits earned during the half-year, and of this amount the United States Steel Corporation contributed $28,025,888, or 42.8 per cent, being 3.5 per cent paid to 31,799 preferred shareholders, and 2 per cent to 26,830 common. Twelve other iron and steel companies disbursed $4,159,285, principally in quarterly dividends, at annual rates ranging from 4 to 7 per cent. The Standard Oil Company made the second largest disbursement, reporting $26,190,000 in the form of two quarterly dividends, amounting to 27 per cent paid to its few shareholders, who, by the way, received $2,900,000, or 3 per cent, less than last year. Eighteen other petroleum and natural gas companies paid $1,437,328, which is equivalent to from 4 to 24 per cent per annum, the higher rate being shown by two California oil companies. Coal and coke companies are prosperous, and in several instances have increased their dividend rate in addition to placing substantial amounts to their reserve fund. Thirteen such concerns paid their stockholders an aggregate of $2,780,608 in annual dividends of 2 to 10 per cent. Eight chemical, cement and other mineral companies paid dividends of $2,884,848, or at the annual rate of 5 to 16 per cent.

There has been a satisfactory advance in the dividend payments by metal mines, notably copper and gold. In all 83 mines and metallurgical works paid dividends of $15,665,994, which is equivalent to about 19 per cent of the total for the whole mineral industry. Foremost this year are the gold, silver and lead properties, situated chiefly in Colorado and Utah, of which 62 have paid $7,387,771. The American Smelting & Refining Company reported the largest dividends—$1,750,000, or 3.5 per cent on its preferred stock, but nothing on the common. Silver King, of Utah, leads the precious metal mines, disbursing $600,000, or 20 per cent for the half-year, while its neighbor, Daly West, has come forward with $540,000, or 18 per cent on its capitalization. Of the stocks in which foreign investors are mostly interested the Camp Bird gold mine, of Colorado, yielded dividends of $233,700, or at the rate of 12 per cent per annum. Alaska-Treadwell, probably the best paying low-grade gold mine in the world, reported $230,000, or 4.6 per cent, for the half-year. There were numerous smaller payers that divided monthly, but the tendency is to change to a quarterly basis for convenience in bookkeeping.

The copper mines are gradually recovering from the demoralized metal market of last year, and, judging from the increased dividend paid in the second quarter by the Calumet & Hecla Company, earnings are improving. This mine paid $1,500,000 in dividends for the half-year, which is equivalent to 60 per cent on a capitalization of $2,500,000. Amalgamated, which is essentially a holding company, paid only 1 per cent, or $1,538,860, on its issued capital of $153,887,900. Two of Amalgamated's subsidiary companies paid $1,200,000, half being credited to Boston & Montana at the rate of 16 per cent for the six months, and half to Anaconda at 5 per cent. These dividends formed the basis of the Amalgamated payments. Ten other copper mines, situated principally in Michigan and Arizona, gave out $2,964,564 as dividends, equivalent to an annual rate varying from 4 to 24 per cent on the capitalization.

Four zinc mines, headed by the New Jersey Zinc Company, which pays 12 per cent annually, declared dividends amounting to $643,639. Two California quicksilver properties paid $81,500, and one nickel company, $349,660.

In addition to the above, 23 Mexican gold, silver and copper properties reported $1,362,489, principally in monthly dividends; four Central and South American mines, in which Americans are interested, $213,402, and three Canadian concerns, $416,600.

MARKET CONDITIONS.

The metal markets continue, for the most part, quiet and even dull. While consumption, as we have heretofore noted, continues large, there is a hesitation about placing new orders, which results partly from the labor troubles and partly from uncertainty as to the course of the speculative markets.

Large buyers of copper continue to hold back, and sales that have been made have been on a small scale, and mostly for immediate delivery. The consumers seem to have made up their minds to a waiting policy, in the hope of still further concessions in the price by producers. Inquiries are frequent, but do not, so far, result in actual transactions. On the other hand, manufacturers who have bought copper for July, are urging the earliest possible deliveries. While producers are not pressing metal for sale, they are, nevertheless, generally ready to meet the market, but this does not seem to satisfy the large buyers.

In tin a moderate business only has been transacted, generally for near-by deliveries. There have been only slight variations in price.

Business in lead continues about on the usual level, and consumption does not seem to have been much affected, though the labor troubles, of course, have tended to diminish the local demand.

Spelter continues strong, although there has been somewhat less excitement in the market, and demand seems to be approaching more nearly to a level with production.

Silver has shown but little change during the week, and there have been no happenings to affect the market either way.

The iron trade is still in an uncertain condition, and new orders and new contracts are not very plentiful. Buyers seem contented to hold back, as they have been doing for some time past, and purchases are only for immediate requirements. It does not seem probable, however, that this condition of affairs can continue very much longer. Foundries are approaching the bottom of their stock-piles, and manufacturers generally are rather short of material to complete their orders. On the other hand, producers are reported as being more inclined to make concessions where good orders are in sight, and many observers believe that the end of the deadlock is not far distant. Much, however, depends upon the course of the existing labor troubles.

The Western coal trade is again being disturbed by delays in the delivery and shipment of Lake coal. Local supplies, however, are generally good, and local trade is in a fair condition.

The Atlantic seaboard bituminous trade continues quiet. The short car supply at the mines still affects shipments. Demand is strongest along the Long Island Sound, and in all-rail trade. Prices for Clearfield grades show no change.

In the anthracite trade activity continues, with demand strong at Eastern points, and in Chicago territory. The shipments from the mines continue large, though it is quite possible that owing partly to the attitude of the miners, the output for demand at the mines is slightly less than a few months ago.

One of the differences between the practical man and the young educated engineer is that the former is capable simply of doing over and over what he has done before, while the educated man has a power which enables him to take up new problems.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

MINE SAMPLING.

The Editor:

Sir.—In common with many of your readers I have enjoyed the discussion that has appeared in your columns over the methods and details of mine sampling, and, in connection therewith, I am tempted to break the silence generally held by me, to mention an interesting incident of sampling that occurred in a mine in California.

The ore was the usual quartzose schist of the middle counties of the Mother Lode. About 50 lb. had been broken from a 12-ft. face of ore, and while wet and a little sticky, it was broken down to about ½-in. pieces; after the usual rolling and quartering upon ordinary cotton duck, it occurred to me that it would be interesting to take the two final quarters, crushed to about ⅛ in., and weighing about 10 lb., as two samples, and have them assayed separately, because it is generally assumed that the final quarterings are of equal assay value.

Much to my surprise one quarter assayed $14.80, the other, $3.90, in gold per ton. Upon inspecting the samples, from other cuts, carefully, I found the gold occurred in small wires, and that these wires were sharp and very easily penetrated the cotton duck, so that a form of concentration was being effected the more the sample was rolled. To obviate the trouble the large samples were placed in a gunny-sack, brought to the surface and dried, and a canvas having a prepared, or soft enameled, surface, was used thereafter in all work involving gold and silver determinations. The enamel of the cloth admits of a thorough admixture of the sample, and at the same time prevents the gold from adhering to the canvas—the action being similar to that of glazed paper in the laboratory.

I think it a great mistake not to have some means of identifying a sample after it has been closed and sealed, and a serial number, not necessarily the sample number, should always be placed on the bag as soon as the sample is sacked and tied.

RICHARD A. PARKER.

Boston, June 20, 1903.

The Editor:

Sir.—It would seem from Mr. Philip Argall's references, in your issue of June 13, to my criticisms of his former article, that we are arguing somewhat at cross purposes. I certainly did not object to the classification of ore estimates. What I do deprecate is the adoption of cast iron definitions for such classes, which will not admit of variation with varying conditions. To illustrate: I object to using the same expressions to denote estimates of ore in a pockety fissure vein and a comparatively regular impregnated bed, merely because both are exposed on one, two or more sides, as the case may be.

I did not suggest that my brother was the originator of the division of ore-reserves into the three classes of "positive," "probable" and "possible" ore. I believe he adopted the idea from Mr. Arthur Winslow, who has made use of three similar classes in his Liberty Bell annual reports for years past. Mr. Winslow, however, using his own discretion and relying on his personal judgment as to the mine he is dealing with, is far less exacting in his requirements as to number of sides exposed than Mr. Argall, Mr. Lawrence, or the late Mr. Arthur L. Collins. He carries out, in fact, the principle that "the amount of evidence to be required when making estimates of ore-tonnage, and the number and nature of classes into which estimates should be divided, must depend on our general conclusions as to the nature and permanence of the ore-bodies in the mines under consideration, the distance between the workings, etc."

In figuring the ore-body No. 2 in my letter I did not mean to imply that that particular shape was typical, but that similarly irregular ore-bodies are "typical of perhaps the largest number of ore-bodies in fissure veins." The regular ore-shoots of the text-books, in fact, are not very common in the field.

I think Mr. Argall may fairly be asked to explain what he means when he speaks of my ideas being apparently connected with "not over good mining." It will be remembered that I was discussing the mining of irregularly-occurring ore-bodies in fissure veins, as to which I will venture to state two propositions:

1. It is not, necessarily or usually, good mining to open up such a vein in blocks of 150 ft. by 300 ft. Each case must be decided on its own merits.

2. Any expenditure in the working of such deposits beyond the minimum necessary to discover and extract them may assist good experting. It is not part of good mining.

I did not, however, object to the expense of opening up a mine "in blocks of 150 ft. by 300 ft.," but to expense in raises, etc., for the sole purpose of blocking out irregular ore-bodies, and not necessary for their economical exploitation; working mines, in fact, for the best showing rather than for the greatest profit.

Are we not all apt to forget, at times, that mining engineers exist only for the sake of the mines, and not vice versa?

GEORGE E. COLLINS.

Denver, Colo., June 22, 1903.

METALLURGY OF COPPER ORES.

The Editor:

Sir.—Having read many articles in your JOURNAL concerning methods of treating copper ores cheaply, I would like to make a few remarks upon my work in this line as referred to by Mr. John Burgess in the issue of May 16. The method there described is the reduction of the copper in oxidized ores to the metallic state with carbonaceous fuel and the subsequent concentration of the copper globules formed, the process requiring no fluxes.

It appears to me that in the descriptions of this process, in all the articles I have read, one important point has been overlooked; this is the fact that when ore and fuel are mixed directly and air introduced, there is an oxidizing atmosphere at the points where air enters, no matter how strongly reducing the atmosphere may be elsewhere. I do not know of any process discussed where provision has been made to guard against the partial oxidation of copper formed or for making sure that all copper is in a metallic state at the time it leaves the furnace.

I have seen an experimental plant in operation, aside from my own work, where an attempt was made to prevent re-oxidation of the copper formed by having the blast pass through some burning fuel before reaching the mixture of ore and fuel. For a successful safeguard, however, all the oxygen would have to become united with carbon. This renders direct mixing of ore and fuel impracticable. The atmosphere is oxidizing at the very point where the ore is to be discharged.

If a furnace is divided into two compartments, one for fuel and one for ore, then steam may be injected into the burning fuel to form a reducing atmosphere and the hot gases can be passed through the ore in the other compartment, thus using the full value both in the calorific and reducing way. The process can be made continuous with no danger of oxidation, while the coal and ore supply can be perfectly adjusted. Moreover, the ore need not be crushed as fine as when particles are mixed.

I have found no difficulty in reducing copper on a large scale by this method.

This method should be especially valuable for ore unsuited to leaching, such as copper silicate or ores containing lime, etc. There are also many places where smelting is not practicable through lack of fluxes. All oxidized copper ores are reduced while sulphides are melted without volatilization.

JOHN HERMAN.

Bisbee, Arizona, June 17, 1903.

THE GEOLOGIST IN RELATION TO MINING.

The Editor:

Sir.—The writing of my original article must have been crude, or the expression unfortunate, for quite different ideas have been read out of it from that which I purposed. My desire was to emphasize the value of the application of the science of geology to mining operations, and to urge that it receive earnest attention and study from all those interested in such undertakings. Originally, the title of the article was "Geology Applied to Mining," but as I had already written an article in another journal under that title, I cast around to find a paraphrase, and substituted "The Geologist in Matters of Practical Mining." Afterwards, before the article was published, it was criticised on the ground that its title referred to the geologist, and its contents to geology in the abstract; and to meet the criticism, I changed the references so that they stood in the name of the scientist instead of the science. For that substitution I think I was justified, but the fact may explain that the geologist was considered entirely in the abstract and may account for a tone and style, which, unless it is understood that nothing was further from my mind than persons or personalities, might well be considered too assuming. By some I have been mistaken as meaning to boast of the capabilities of the geologist, and to look down upon the abilities of the miner and the mining engineer. Nothing, I repeat, was further from my mind. Perceiving the recent rapid advance of the science, and its yet (as I believe) only dimly-perceived application to every-day operations, I sketched out those possibilities. In such a manner I might sketch out the attainments of modern surgery, were I a physician, without meaning to imply that I, or perhaps any of my colleagues, had or were individually able to accomplish such wonderful results.

The use of the term *practical* was also unfortunate. I should have written "The Geologist in Matters of Mining," or, still better, "Geology in Matters of Mining." It would have had the same meaning, and would have obviated the misconception aroused in the minds of some that I was announcing the geologist as a replacer of "practical" men—or designing to replace mining engineers and mine managers. This is exactly the opposite of my conception.

There is, I find, a fundamental agreement among all the writers as to the value of geology in mining, and that was the only point I meant to make. My use of the word geologist, however, has given rise to a discussion as to who is the better geologist, the prospector, the miner, the mine captain, the mining engineer, or the professional geologist. I should say, on this point, doubtless sometimes one, sometimes the other, according to individual ability. But the chances are certainly in favor of him who gives his whole time, instead of a part of it, to the study; and he then becomes a professional geologist, whatever he was before.

With evolution and development, as in every other phase of life, complexity ensues. The varied duties and the variety of knowledge required becomes beyond the power of one man, or two, or three; and specialists arise—not by their own thought, but by the irresistible force of necessity. The mining geologist is certainly among the very latest products, but is he *therefore* to be held in little esteem by the older inhabitants? The mining engineer is comparatively speaking, a modern product. A miner told me the other day that he remembered when mining engineers were looked upon as "people who made pictures of what the miners did." The mine captain is a more ancient institution, dating back to the origin of organized labor; his prototype is the master that directed the slaves who extracted the gold from the sands of old Egypt and India; but he will not place much pride in his family tree, nor will he have derived many admirable qualities from it, for he, too, is after all, a modern product, the product of intelligence and co-operation and freedom, and the dignity of labor. The miner is the most ancient of all, and can trace his craft back to the savages who dug red clay to smear their faces and chipped flints

for arrowheads; but he is hardly likely to lay much stress on that, any more than we feel humiliated because our forefathers were skin-clad Teuton savages, when the ancestors of the Greek banana merchant on the corner were free and enlightened men.

I trust I may be pardoned if I reply to some arguments which I do not think the writers meant deliberately. I take the more important ones only and neglect the lesser points, for I assume that one does not have to demonstrate that a man may not have candle-grease on his overalls and still have furnishings on the inside of his head. He may have changed his clothes before coming to supper, for instance.

Mr. Argall reasons that since it was not geologists who discovered Leadville, San Juan, Cripple Creek, etc., it is an evidence that the professional geologist has not "advanced knowledge by reason of his experience, superior reasoning powers, or intuition." Mr. Penberthy goes at the thing more directly, saying, "I never knew of a geologist who discovered a mine." So far as the last statement goes, I never heard of a mining engineer or a mine captain who discovered a mine. 'Pon my honor, that's true. But it only proves my limited knowledge; and the same with Mr. Argall and Mr. Penberthy. I *have* heard of geologists who discovered mines. That's honest, too; but it has nothing to do with the case. The discoverers of mines, who have come under my knowledge, are first of all prospectors, then shepherds, bartenders, teamsters, Indians and children. A young mining engineer of my acquaintance, after a number of mistakes, expressed the theory that "the less you knew the more likely you were to succeed in prospecting." I don't exactly agree; it is the overwhelming balance of finds by the unskilled crowd which makes the search of the skilled few seem insignificant.

I doubt if I have to remind Mr. Argall of the discovery of Leadville; how the placer miners who worked the gravels for gold in California gulch used to be bothered with the chunks of gray gravel (lead carbonate) which they found in their sluice-boxes, and shoveled them out and consigned them to perdition with infinite trouble. I doubt whether a geologist would have done that. And how later on, ore was struck in place by prospectors who were drunk (so runs the story) and sunk without any sign or reason whatever. A geologist *might* have done that. Does this recall Mr. Forbes Rickard's theory that "the prospector by experience develops an instinct for the detection of the 'earmarks' of the deposits he seeks, and is guided by data too subtle for analysis"? Later on, a salted hole was sold to a storekeeper, and he sank on it and struck an orebody. And so runs the story.

Concerning Cripple Creek, Mr. T. A. Rickard remarks:[1]

"Prospecting at first was hindered by the comparative absence of outcrops . . . but so much *indiscriminate digging*[2] was done that a number of rich veins were uncovered, and this stimulated the search for others." Data too subtle for analysis. Quite.

I don't know anything about the discovery of the San Juan. Perhaps somebody will favor us.

All this, I repeat, has nothing to do with the case; but I may adduce some points which are pertinent. In the first place, a geologist has no time to prospect, just as you, mining engineer or mine owner, have no time—no more than you have to do your own cooking. You leave the almost hopeless searching, and seek higher walks of life and more assured results. So does the geologist. Second, to one geologist there is a vast army of prospectors, miners and people who "have their eye out for mineral." If there is one of that army to which chance, or chance and intelligence combined, brings the reward of the discovery of a mine, there is the overwhelming mass whose lives are spent in useless toil and waiting.

I cannot help taking up for a moment Purington's argument, who, it seems to me, has based his case for the miner against the geologists on three fallacies. Mr. Purington says:

"To recapitulate, the miner has on his side, first, antiquity; second, inherited experience; third, his right as a producer of wealth, as grounds upon which to found his protest against the encroachment of the mining geologist on his realm. On the other hand, the geologist cannot urge the antiquity of his profession; has little, if any, inheritance of experience, and, so far from being a producer, is usually a consumer of the wealth produced." Mr. Purington's first proposition, as I understand it, is that *the antiquity of a profession is evidence of its value,* or a *profession is respectable in proportion to its antiquity.* Do you remember, friend Purington, what Kipling called the oldest profession? Aside from this, the oldest professions should be perhaps hunting and fighting; but are the hunter and the fighter necessarily higher in the scale of utility than those modern products, the electrician and the engineer?

In his second point, Mr. Purington advances a remarkable theory, namely, that *knowledge may be inherited.* This is a new one, and I should be interested in learning the evidence. Traits and modifications of character may be transmitted, though with no certainty; but nothing is more certain than that knowledge is not. Knowledge can be inherited only by inheriting the *books,* in whose imperishable speech the accumulated observation and experience of preceding generations are related, as well as those of inaccessible contemporaries. This constitutes ***book-learning,*** **without which, at the mercy of our** own feeble individual inventions, we should be humble savages indeed.

Thirdly, it is proposed that *the miner is a producer of wealth, while the geologist is not.* I will omit the minor point that the geologist is a consumer of wealth, while the miner (I infer) is not. But let us get down to rock-bottom on the first proposition. In mining, who is the producer? Is it the man who drills the holes and lays the fuse, the "miner" of ancient lineage? Undoubtedly, but the "mucker" is also a producer; so is the cage-tender; and perhaps the hoisting engineer is the truest producer of all, for he brings forth (produces) the ore from the bowels of the earth to the surface. But without the hoisting machinery he would not have been able to do this, so the builders of the machinery are producers of ore, and even more so the man who invented the machinery, and above all, the man who invented steam engines. There are a thousand theories and minds and hands producing the ore from a given mine, whether you see them or not. Without tools the miner would be helpless as a kitten, or as a horse pawing the ground. The real work is done by the dynamite, so the dynamite manufacturies must be acknowledged the greater producer, unless we let ourselves be prejudiced by his side profession of producing defunct kings through the medium of wicked anarchists. And above him in importance stands the man who studies and combines high explosives. The mind cannot produce without hands, but without the *Idea* the strong arms are powerless to move a pebble.

To change the illustration, who was the producer of the shoes I have just discarded? Was it not the splitter, the stitcher, the vamper, the laster, the miner, the smelter, the designer, the capitalist, the butcher and the cowboy, or must we lay it all on the cow?

So I am confident that among the thousand producers of ore from a given mine, the geologist has his place. Nay, more, since the value of the product increases with the comprehensiveness of the idea, I believe he does and will stand in a high place. From observation and reflection I should say that a high-grade mining geologist might even succeed in adding, in a single year, as many millions to the world's wealth as the miner earns dollars in a day.

I have gotten entirely off my original subject, following the deviations of my companions in discussion. My intention in the first article was to insist upon the importance of the *study of geology* in mining, and not the importance of the *geologist.* But as to the former there is an unanimity of opinion; and I agree that it is highly important that mining engineers and mine captains should continue or begin to observe and study geology, which indeed was the point I meant to emphasize at the outset.

J. E. SPURR.

Tonopah, Nev., June 15, 1903.

[1] *Transactions* American Institute Mining Engineers. "The Lodes of Cripple Creek." Pamphlet edition.
[2] The italics are mine.—J. E. S.

THE PROPOSED CARNEGIE ENGINEERING BUILDING.

BY R. W. RAYMOND.

The ENGINEERING AND MINING JOURNAL published June 20, the resolutions adopted by the Council of the Institute of Mining Engineers, assuring the co-operation of that society in the acceptance of Mr. Carnegie's munificent offer. Other societies have taken more or less similar action, so that the success of the scheme in some form is beyond doubt.

The five organizations to which this offer was made are severally so situated that identical action is not immediately practicable. For the information of those who have supposed that serious differences on the main question have hindered the acceptance of the offer, the following outline is offered:

The Engineers' Club—through an auxiliary corporation, the Engineers' Realty Company—has already secured land for its desired clubhouse, and its acceptance of Mr. Carnegie's offer opens a prospect of that most important adjunct to the land, namely, a house upon it. There are no collateral difficulties in the way; and the club's assent has been prompt and enthusiastic.

The Civil Engineers have a fine house of their own, and some of them may naturally doubt whether as occupants of a part of a building, however large and splendid, they would have equally satisfactory accommodations. I think they can be convinced on this point, since I do not doubt that the other societies will cheerfully recognize the primacy of the Civil Engineers, and assign to them whatever they need or prefer in the way of rooms. Meanwhile, it is admitted that the consolidation of library space and administration, the provision for common large and small audience rooms, etc., and the centralization of engineering interests in the metropolis, will be a great benefit to this society as well as others, and it is hoped that these arguments will turn the scale in favor of the plan.

The Mechanical Engineers have a house, which they could easily sell for more than it cost, and they would be better suited in the proposed new building. They are heartily in favor of the change.

The Electrical Engineers have no house, but are bound to have one, if only because of the magnificent bequest of the Clark library of books on electricity and electrical engineering, for which they must provide a fire-proof building. This comparatively young, but extremely vigorous and successful, society has a great future before it, and Mr. Carnegie's offer, made to Mr. Scott, its president, renders all the other societies its debtors. Of course, it accepts the plan which it may be said to have originated.

The Mining Engineers now occupy comfortable quarters in the fire-proof building of Phelps, Dodge & Co., No. 99 John Street, where their library of some 12,000 volumes is consulted daily by experts and other inquirers, who express their thankfulness that such a collection of authorities is available without a journey uptown. At present, the New York consulting engineers have offices downtown, and the daily papers are almost all published near the City Hall. The feeling is natural that, under these conditions, the site in Thirty-ninth Street would be less convenient to members and visitors. But this condition will not hold good for many years. Before long the business center of New York will be fixed, to remain for a century at least, near that site, which will then be really downtown, and close to the great railroad terminals. Whatever may be the immediate inconvenience or expense, the Mining Engineers are in favor of the Carnegie plan.

The Institute has never been incorporated, and

cannot, therefore, hold real estate. This is a result of the nature of the society, which has never had an authorized permanent headquarters at any one place. The office of the secretary has been successively at Lambertville, N. J.; Philadelphia, Pa.; Easton, Pa., and New York City, according to the residence of the secretary for the time being; the office of the president has been similarly peripatetic, located from time to time at Hokendauqua, Pa.; New York City, Boston, Mass.; Drifton, Pa.; Pittsburg, Pa.; Troy, N. Y.; St. Louis, Mo.; Denver, Colo.; Bethlehem, Pa., or Trenton, N. J.—in short, wherever the president resided. The meetings of the Council have been held wherever was most convenient—perhaps most frequently at the localities, and between the sessions, of the general meetings of the Institute. And these general meetings, 84 in number, have been held at 51 different places, ranging from Cape Breton, N. S., southward to the City of Mexico and westward to San Francisco. The signal success for 32 years of this peculiar organization and management has caused, hitherto, a general disinclination to incorporate the Institute under the laws of any one State, thereby necessarily establishing its permanent official headquarters in that State. The present sentiment of the members, however, is overwhelmingly in favor of such a localization of headquarters in New York City as the acceptance of Mr. Carnegie's offer involves; and the necessary amendments to the rules, carefully devised to protect the essential features of the present system, will doubtless be presented at the October meeting, and finally adopted in February next.

But the plan first provisionally suggested for the formal acceptance of Mr. Carnegie's offer involved identical action by all the organizations concerned, agreeing to hold jointly the land and the building in fee simple, as tenants in common. This arrangement was open to decisive objections, as I believe all parties now agree. The development and discussion of these objections prevented immediate final action by the different societies, and probably gave rise to the unfounded reports of dissension as to the main proposition. Stated in a single sentence, tenancy in common would not only cause many complications, but would permit, in any one of several possible contingencies, proceedings for a partition sale of the whole property. Moreover, from the standpoint of the donor, this gift ought to create a permanent establishment, independent of the fate or acts of any one of the four professional societies named.

The way to carry out this plan most wisely would be, in my judgment, to let the building to be occupied by the national engineering societies be owned by a board, specially incorporated for the purpose. Personally, I have no doubt that such an incorporation could be made under the present statutes of New York, so that the property, so long as used for the purpose named, and without profit to the corporation, would be free from taxation. If there be the least doubt on that point, however, there would be no difficulty in obtaining from the Legislature a special act, similar to the charter of the Cooper Union, permitting the renting of rooms, etc., so long as the income was devoted only to the educational and scientific purpose of the corporation, or the simple maintenance, repair and improvement of the building.

This corporation should consist of representatives appointed by the four national engineering societies already named; but it should be possible, in certain specified contingencies, to substitute or add the representatives of other scientific societies. The corporation should issue, under mortgage of the whole property, the bonds necessary to pay for the land; and the several societies should be simple tenants, paying as rent, or in lieu of rent, the annual amount fixed by the corporation. It is not necessary to go further into details. They must be carefully perfected; but they involve no insuperable difficulty. The main result is plain; no matter what may happen to any of the present national engineering societies, this benefaction would continue to operate in the sense in which it has been proposed for generations to come. The portion of the building occupied by the Engineers' Club should be owned and managed by that club. But that is a detail, easily to be arranged hereafter.

Something like this, I hope, will be arranged by the Joint Committee and approved by Mr. Carnegie. I am not a member of the committee, however, and these are my private, unofficial views only.

DO WE LIVE OR DO WE DREAM?

BY AN OCCASIONAL CORRESPONDENT.

There are occasions when men who devote their lives to ascertaining the laws of nature run up against conditions which are apparently inexplicable, and where the man with a guess, a hunch, or merely a profound ignorance, plunges ahead and succeeds.

In practical geology there has been no problem of recent years which has caused more perplexity than the occurrence of oil beneath the Coast Prairie Region of Texas and Louisiana. Able students have collected data there and attempted to interpret the phenomena, and I believe, as a rule, that the abler the student the more cautious has he been in reaching conclusions. Capt. A. F. Lucas, who first brought in the wonderful oil gushers at Beaumont, was a scientific man, and his happy practical result was largely due to his careful observations and deductions from natural phenomena. Since its discovery the attempts to extend the productive oil area have presented the most fruitful field for charlatanism the world has ever seen, and all kinds of quacks and humbugs have been consulted and remunerated. The man with the electric oil finding machine, the fellow with a switch, the boy who could see currents underground at night, and a swarm of quack geologists have found abundant capital ready to believe that science is a humbug and to back their peculiar methods with dollars.

Meanwhile, as time rolled by, the famous gushers of Spindle Top ceased to gush and the money of innocent investors likewise ceased to flow into the pockets of hundreds of company organizers who have thrived parasitically upon the success of the legitimate business men in the region. Not only had the gushers ceased to gush, but hot water instead of oil in places was filling the tanks, and Spindle Top, in the language of the people, looked like "a dead one." At this moment, least propitious for such an undertaking, there appeared a beautiful quarto volume in crimson binding announcing the organization of the Standard Oil Company, with a capital of $50,000,000. As a work of typographic art the publication is a model one, and the letter press, plates, maps and geologic sections are such as would naturally make our good farmer friends, who supply most of the sinews of war for such companies, send in their dollars without delay.

The assertions in the text, however, were so amusing that they read like jokes to a scientific man. In order that some of these choice literary gems may not be entirely lost, I append a few extracts:

"This is to certify that I, ———, of Beaumont, Texas, have made a careful and scientific study of the geological formations of Texas and Louisiana. I have paid strict attention to oil, sulphur and iron ore, and I believe that I thoroughly understand the philosophy of minerals."

"I have come to the conclusion that those geologists and other learned men know but little or nothing about the origin and location of oil. None of the oil fields have ever been discovered by these learned men until some one brought in a gusher. Their scientific knowledge helps them to locate an oil field when a gusher is brought in. From what I can learn about the geologists and learned men, they have been stumbling blocks in the way of all the oil fields that have been developed, and they deserve no credit for the same. I think that their scientific knowledge is rather shallow. They were no stumbling blocks to me to turn me against the art of science, but they kept me from raising money for developing purposes."

"I believe that the animal oil is derived from certain kind of animals that were imbedded in the lower strata while they were forming in the oceanic period. The animals were in the form of worms which lived for a certain age and multiplied very rapidly during the upper oceanic formation till they existed in these strata in great masses, the strata at that age being undisturbed by volcanic action. When the volcanic action took place the sulphur d hydrogen gas worked its way into the mass of animals and slew them and their dead bodies turned to oil."

Now here is an interesting sequel: The gentleman who believed that "geologists and other learned men know but little or nothing about the origin and location of oil," although he himself "thoroughly understood the philosophy of minerals," and who was father of the remarkable theory that "oil was derived from worms imbedded in the lower strata while they were forming in the oceanic period, which, when volcanic action took place, were killed and their dead bodies turned into oil through the action of sulphureted hydrogen gas," and who after Spindle Top had practically played out, organized a $50,000,000 company, despite these facts and in the face of the absurdity of his own opinions, last week brought in a 2,000-barrel gusher in the played out Spindle Top field. We tip our hats to this magnificent example of American nerve, pluck and faith which knew not fear and developed wealth in spite of scientific law and previous failure.

DUSTY SHOTS.

We find that in Professor Munroe's article on this subject, which was published in our columns last week, the correspondence between the commission and the officers of the United Mine Workers was omitted. As Professor Munroe considers this correspondence to be of importance, we are glad to give the letters herewith. They are to be read in connection with the article referred to.

One of the most important results attained by the recent shot-firers' commission in Indiana is set forth in the following correspondence:

"TERRE HAUTE, Ind., June 2, 1903.

"*United Mine Workers of America, District No.* 11:

"GENTLEMEN.—

"In signing the report of the Commission recommending the employment of shot-firers in certain mines, we have the assurance of your representative on the Commission, and of the officers of the organization, that you will do everything in your power to prevent the drilling, loading, or firing, of illegal or dangerous shots, or dangerous combination of shots, even when such combinations are not explicitly forbidden by the law. We feel sure that the mine workers of Indiana, personally and collectively, will indorse this action of their officers, and will put a stop to these dangerous shots. Without such assurance we should have hesitated to sign the report of the Commission, as the brief examinations we have made, of a few mines only, have revealed an alarming number of violations of the blasting law by ignorant, or thoughtless, or reckless men among your number. It then becomes your duty, and it should be your pride, for the honor and good repute of your craft, to instruct the ignorant, to warn the thoughtless, and to discipline the reckless, faithfully, vigorously, and relentlessly.

"Sincerely,
"HENRY S. MUNROE,
"WELLINGTON O'CONNOR,
"P. H. PENNA,
"Commissioners."

"Approved:
"JOHN BOYLE, Acting President."

"INDIANAPOLIS, Ind., June 11, 1903.

"HENRY S. MUNROE, ESQ.,
"School of Mines, Columbia University,
"New York, N. Y.

"Dear Sir:

"Upon my return from a trip to Illinois, your favor of June 6 was brought to my attention.

"I beg to assure you that the suggestion made in your letter of June 2 to the United Mine Workers of District No. 11 shall have careful consideration, and I shall do all in my power to aid in having the suggestions carried into effect.

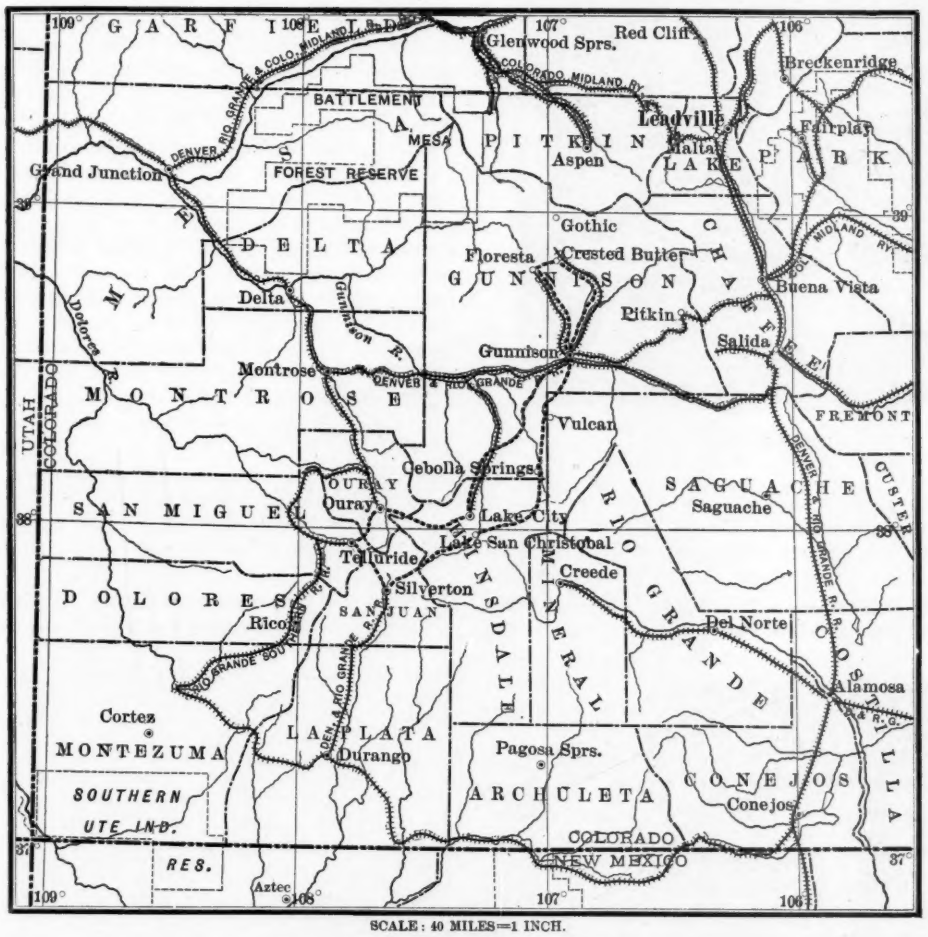
"I am,

"Yours truly,
"JOHN MITCHELL,
"President U. M. W. of A."

ACROSS THE SAN JUAN MOUNTAINS.

By T. A. Rickard.

On a superb morning last September, that month of many colors, four of us[1] started on a ride among the mining districts of the San Juan, in southwestern Colorado. The starting point was Ouray, the picturesque little town named after the old chief, an Indian of renown, the friend of the white men who first explored the mountain fastnesses of the Uncompaghre. From Ouray we rode across the ranges to Telluride, Silverton, Lake City, Gunnison, and thence to Crested Butte and back, following a course which, on the map, looks like a figure 8, with Ouray at the base of the lower loop and Crested Butte at the top. See map. The distance was slightly over 400 miles, the country traversed is beautiful to the traveler and interesting to the mining engineer, so that the experience was sufficiently rich in incidents and information to warrant the account which it is my purpose to present.



SCALE: 40 MILES=1 INCH.

MAP OF SOUTHWESTERN COLORADO.

Route shown by dotted line.

We left Ouray early on the 5th of September, with the intention of visiting two mines in the vicinity—the American Nettie and the Bachelor. A mile below the town the trail ascends the precipitous sides of Gold Hill, and as our sure-footed mountain horses followed the zig-zag through the pines we found that each turn of the trail brought a steadily expanding vista until, halting on a projecting rock, we could see far out toward the north to the table-lands behind Montrose, across the near valley to the terraced dip-slopes of Triassic sandstone, down upon Ouray itself, cradled amid red rocks and golden aspens, and up beyond the town to the sentinel peak of Mt. Abram, which guards the sources of the swiftly flowing Uncompaghre.

On arrival at the American Nettie Mine the superintendent, Mr. Kunz, permitted us to visit the underground workings. These have an aggregate length of 12 miles, and consist of a series of adits and drifts penetrating the top layers of the Dakota sandstone where it comes in contact with the overlying black shales of the Colorado series. Both formations are members of the Cretaceous, the Dakota being the basal member of that division. The ore is found in irregular masses occupying chambers in the sandstone and impregnating the rock along stringers or small veins which serve as a guide in prospecting. In the cavities the ore consists chiefly of a sintery mass of oxidized material interspersed with ocherous ironstone, but when the ore is found impregnating the body of the sandstone it appears in the form of sulphides—iron and copper pyrites, blende, galena and gray copper. The best ore seems to hug the contact with the overlying shales, in the manner illustrated in Fig. 1, where A and B are "pockets" of ore reaching downward from the shale-sandstone parting and connected by a seam X Y, which follows the line of division between the two rock formations. The pockets are full of crumbly oxidized ore intermixed with a little gypsum, while X Y also carries some gypsum and a thin layer of black crumbly lime-shale which suggests that it originated from the dissolution of an impure gypsum.

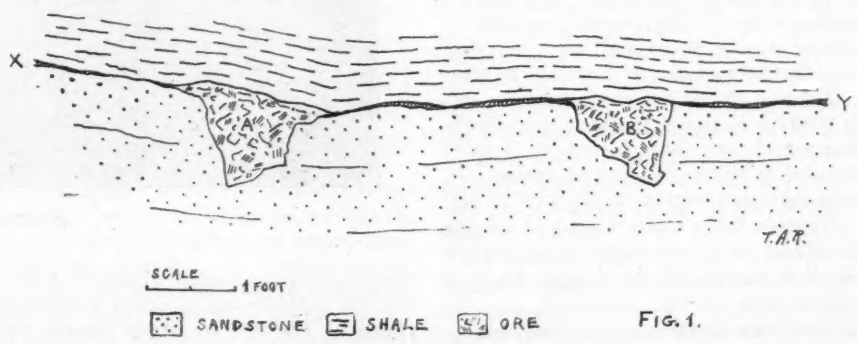


FIG. 1.

AMERICAN-NETTIE MINE

The country lies flat, with a slight dip to the northeast, and it is crossed by almost vertical dikes which have evidently been the immediate cause of such fracturing of the sandstone as was favorable to subsequent ore deposition. In prospecting, it is found best to follow stringers of pyrite or even mere "walls" (slight fractures devoid of ore) which are parallel to the course of the dikes.

These dikes are peculiar, they are not made up of volcanic rock; on the contrary, they consist of clastic[2] material, that is, fragments of sedimentary rock, and in this case the fragments were recognizable as pieces of sandstone, probably derived from beds not far away. The dikes which we saw were 2 to 4 ft. in width, and were well defined by their distinct walls; the country near them was fractured and sheeted, a condition which is probably due to the disturbance brought about by the intrusions of volcanic rock, which are known to occur in certain parts of Gold Hill. Not that the clastic dikes are of direct volcanic origin—quite the contrary—they are built up entirely of sedimentary rock material which has been packed together and cemented by the water which has found its way into them; they occupy fractures which may have been, and probably were, the indirect result of an intrusion, through the neighboring formation, of true eruptive matter, such as has been referred to as actually occurring near by. On the high ridge above the American Nettie Mine there is a coarsely porphyritic diorite which suggests an agency capable of having brought about the fracturing which led, first, to the formation of the clastic dikes and, subsequently, to the circulation of the ore-depositing waters.

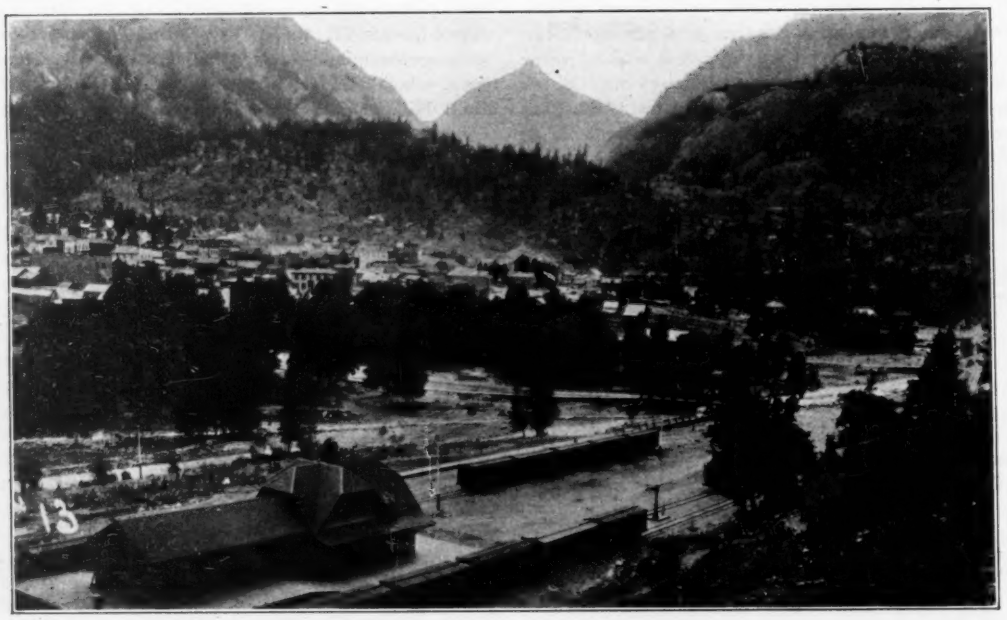
The American Nettie has a new tramway, whose catenary curve sweeps from the high cliffs of Gold Hill and bridges with undeviating line the abyss of the valley. It is a picturesque bit of engineering. A descent of 1,820 ft. is made in 4,200 ft. The span which crosses the valley is 2,100 ft. in length, and in that distance the drop is 915 ft. The Leschen Company built it and, owing to the very abrupt contour of the ground, they had to make especial provision for safety. The descending side has a cable 1⅛-in. diameter, while the cable upon which the empties return is 1 inch in diameter. The traction rope is ¾ in. To the latter button-shaped clips are permanently attached, with intervening spaces, whose length is regulated by the number of buckets in use. The buckets are automatically detached and attached to the rope, at the loading and terminal stations; at both terminals the buckets receive a retarding and accelerating movement, as they arrive and depart, respectively, in order to diminish the vibration attendant on the removal of the load from the line, and the return of it into service. The accompanying photograph illustrates one of the terminals.

On leaving the Nettie we followed the trail which took us around the northern ramparts of Gold Hill, downward into the valley, whence a road led to the Bachelor Mine in Red Canyon. Two members of the party, who were unused to the mountain horse, marveled at his sure-footedness as we scrambled down *talus* slopes and threaded our way among loose blocks of fallen rock. It is my experience that a good "trail horse" will go almost anywhere that a man can go without using his hands, while the patient *burro* (donkey) will walk safely over ledges which bring a tremor to the hearts of those who are not mountaineers. All the exploratory work of the

[1] The party consisted of Messrs. H. N. Tod, Lionel Lindsay, C. H. Wittenoom and the writer.

[2] From the Greek, *klastos*, broken. It is employed to describe rocks made up of fragments, as distinguished from the crystalline.

Rocky Mountain regions was done by "packing," that is, by the transport of supplies and machinery on the backs of animals. Both mules and donkeys are used in this service. When the former are employed they are strung out in a line and connected by rope. A man rides the leading mule and guides the whole cavalcade. Another man usually walks or rides in the rear. When *burros* (the word donkey being rarely heard in the mining regions) are engaged in packing they are not tied together, but



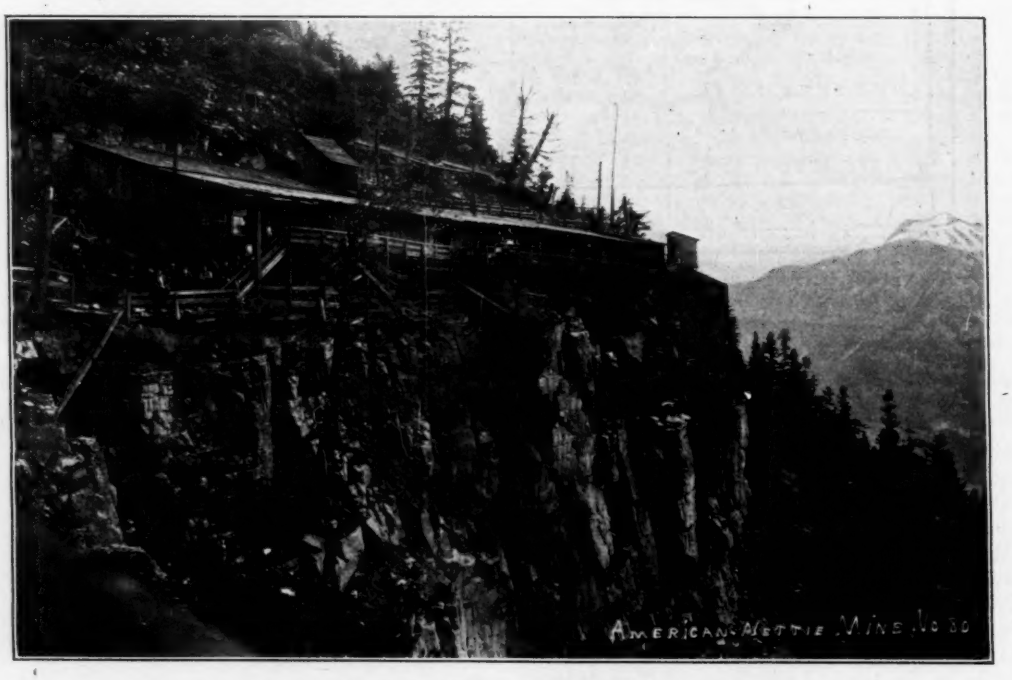
OURAY, COLORADO. MT. ABRAM IN BACKGROUND.

each goes loose and the owner drives them like a flock of sheep, differing only from the latter in that they have learned, from the narrowness of the trails, to walk in single file when that is required for safety. A mule will carry 250 lb. up grade and 350 lb. down, while a *burro* can manage to carry an average of 200 lb. The mule requires to be fed, but the *burro* can eke out a precarious existence on the scant grass of the mountain slopes, and for this reason he has been most serviceable to the pioneers and the prospector; if the camel be named "the ship of the desert" then the patient long-eared friend of the miner might well be christened "the porter of the hills."

When we reached the Bachelor Mine the noonday meal was ready, so we accepted the invitation of Mr. George Hurlbut, the principal owner of the mine, to take luncheon before going underground. It will not be out of place to refer to the food which miners get in localities like these; it is surprisingly good, as a rule, even at properties which are a couple of miles above sea level and a corresponding distance from the main distributing points for provisions. The companies usually charge one dollar per day for board and lodging, where standard wages are $3 per shift. The fare which the miner gets three times a day is superior to that of the second-class hotel of the neighboring mining towns and far better than that which is the daily portion of workmen in other countries. There is always one weak spot—the coffee; partly because it is not prepared immediately before being served and partly because it is made from adulterated mixtures, and largely because the average mine cook does not know the taste of real coffee—at all events, it is a concoction out of keeping with the excellence of the remainder of the miner's fare and much better adapted for staining floors or removing boiler scale.

The Bachelor lode is closely associated with a clastic dike of peculiar character; the same lode follows the dike through the mines to the east, the Khedive, and to the west the Wedge. Light-colored sandstones and shales, belonging to the upper subdivision of the Triassic, form the prevailing formation; their dip is slightly southeastward and they are crossed almost at right angles by a dike, which inclines a little to the north and follows a fault-fissure of small displacement. In the Khedive the sedimentaries form a low monoclinal fold broken by the dike-fissure, with an amount of dislocation so slight as to be difficult of measurement. The zinc-lead-silver lode of the mine traverses both dike and country. When small it usually follows one or other of the walls of the dike, and when enlarged it spreads out into both dike and country. The lode has a northing of 45 ft. in 480 ft., but this is due not so much to deviation from the perpendicular as it is the result of frequent offsets caused by slips along the bedding planes of the country. These do not fault the ore, because they antedate it, but they cause the vein to diverge to one side in accordance with the course of the fracture along which the dike first, and the lode-forming solutions afterwards, found a passage. The ore frequently spreads out between the bedding planes of the sandstone and shales; it is also found in seams following fractures in the outer country, which appear to be sympathetic to the main fissure occupied by the dike and the lode proper. The dike is usually about 2 ft. in width.

(To be Continued.)



AMERICAN NETTIE MINE. OURAY.

HOT SPRINGS.*

By Edouard Suess.

The fundamental principle governing the occurrence of hot springs is still shrouded in doubt. The older geological text-books tell us that such springs are fed by infiltration of surface waters, which penetrate to considerable depths in the earth's crust, become heated, and return to the surface, taking mineral substances in solution on their way. It follows from this that the depth reached by infiltering waters may be estimated approximately from the average increase of the earth's temperature, and, furthermore, that the dissolved mineral constituents give a key to the character of the rocks through which the waters have flowed. In 1880, however, the truth of this hypothesis was seriously questioned by Franz von Hauer, F. von Hochstetter, and Heinrich Wolf, who had been consulted in regard to the preservation of the Carlsbad springs, which are situated in a granitic region; in their report these geologists expressed their inability to determine the zone of infiltration even in a most general way. Laube also found no explanation for the great quantity of lime carbonate deposited by the Carlsbad springs or for their extraordinary flowage. Ludwig and Mauthner were unable to account for the large amount of sodium salts, and expressed the opinion that the chief source of the solid constituents of the waters was the unknown region within the earth, and not the granite, as commonly supposed. Rosiwal could find no agreement between the rainfall of Carlsbad and the flow of the springs, while he believed that the carbon dioxide came from a hot magma.

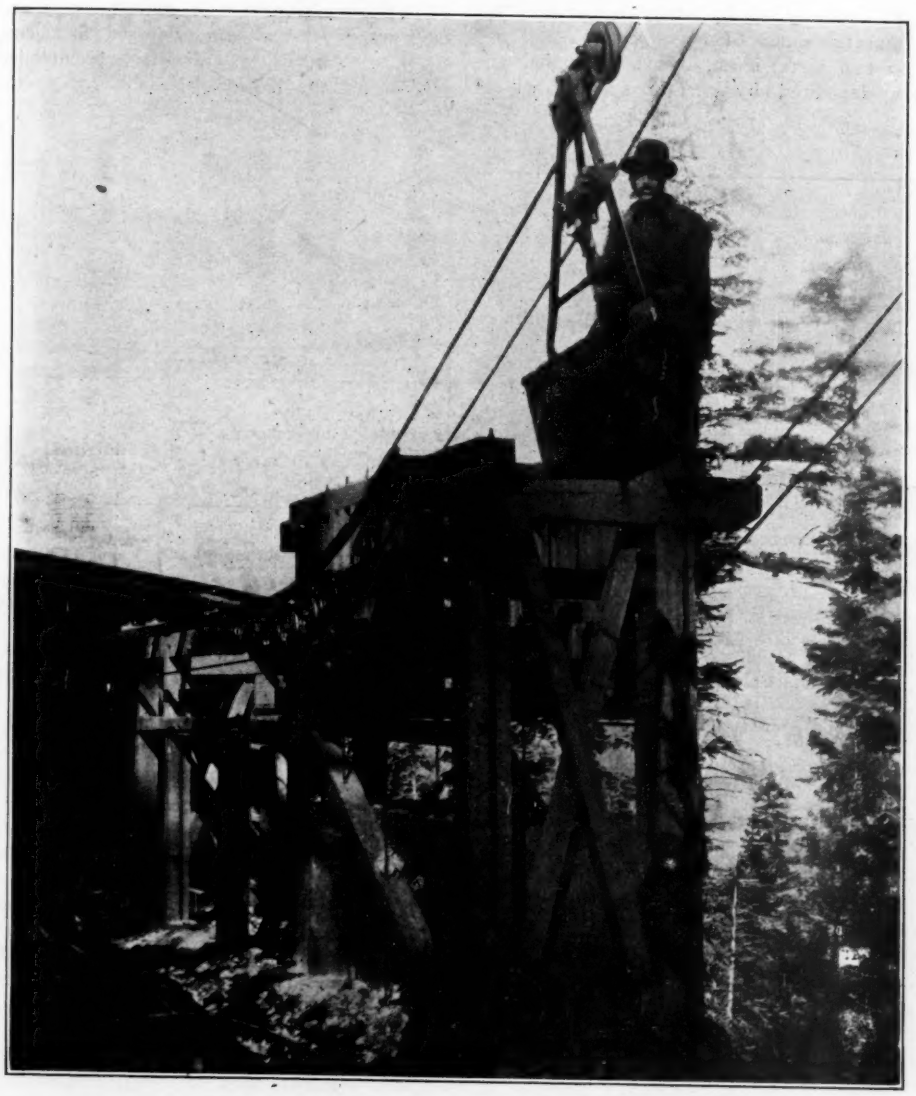
It seems highly probable that similar doubts might be expressed as to the application of this hypothesis in other regions. I do not wish, however, to advance any new explanation in its place, but shall call attention to an old hypothesis, which I believe has been undeservedly neglected by geologists. As a preface to the discussion there are two subjects that need to be made clear.

In a remarkable address delivered before the American Institute of Mining Engineers in 1893, Posepny distinguished between infiltering surface waters and those which reach the surface from great depths.[1] The former he designated as *vadose* or waters of shallow circulation. I shall

* "Ueber-Heisse Quellen," von Edouard Suess; Gesellschaft Deutscher Naturforscher und Arzte, Verhandlungen, 1902, Leipzig. Translated by D. H. Newland.

[1] F. Posepny, "The Genesis of Ore Deposits," *Transactions* American Institute of Mining Engineers, vol. xxii, 1893, page 149.

adopt this expression, and extend its application so as to include not only infiltering waters, but all parts of the hydrosphere—the ocean, the rivers, clouds and rain. There are vadose waters which rise in a heated condition in artesian wells. Vadose waters, frequently containing carbon dioxide, penetrate from the surface into the upper portions of ore deposits and by the processes of solution and precipitation cause a migration of the minerals. Vadose carbon dioxide, with marsh gas, is given off in coal seams, and compounds of vadose chlorine, sulphur, bromine and iodine are found in the ocean and in salt deposits. The term vadose may be applied to the hydrogen disulphide formed by the action of bacteria in the depths of the Black Sea.



UNLOADING TERMINAL OF AMERICAN NETTIE TRAMWAY.

The second matter requiring explanation is the *pulsation* of springs. There are two classes of pulsating springs. The more or less rhythmic flow of the Great Geyser of Iceland has been studied by Bunsen, and the results of his investigation need only be outlined here. This geyser has a cylindrical tube formed by the deposition of sinter. Bubbles of superheated steam passing into the tube are influenced by the pressure of the water column in the tube, and consequently the boiling point is not reached until the temperature is considerably above 100° C. When by the continued influx of steam the water reaches the boiling point for that depth, an explosion follows which hurls the water column by repeated jets into the air. This action lasts until the tube is emptied below the point of influx. The average period between successive outbursts has increased considerably; in 1772 the interval was about 30 minutes; in 1805 about 6 hours; in 1860 from 4 to 5 days, while at present the period may be as long as 20 days. Springs of this class are called geysers or eruptive springs. The springs of the second class, to which the Carlsbad springs belong, are characterized by shorter and more irregular periods of activity, and their pulsation arises from another cause. The superficial rocks in regions where such springs occur have been formed by deposition of materials from solution, and are loosely textured with numerous small caverns, which serve to collect the carbon dioxide. When the pressure of the gas becomes great the water is forced upward. The rhythm of flow is irregular, owing to the variation in the size of the caverns.

I must call attention here to the fact that eruptive springs, unlike artesian wells, are not influenced by hydrostatic pressure. The chief feature of hydrostatic pressure is its uniformity; intermittent flowage of long periods is impossible. With springs of the second class, however, the question of hydrostatic pressure is not so easily decided; but it is safe to presume that the Carlsbad springs are not influenced appreciably by such pressure.

With this preliminary discussion of hot springs, I will turn to the subject of volcanoes, paying attention particularly to the processes which characterize volcanic outbreaks. It is well known that steam plays the principal role in these processes, and that great quantities of this vapor are ejected during eruptions and subsequently fall to the earth as rain. I may note also that geysers are found only in regions of active or extinct volcanism, viz.: In Yellowstone Park, Iceland, San Miquel (Azores), New Zealand, New Guinea, and, according to Pissis, near Chillan in Chile.

Certain moderately active volcanoes exhibit a degree of regularity in their eruptions comparable to that of geysers. This rhythmic pulsation may be called the Stromboli phase. The eruptions of Vesuvius in November, 1867, followed so regularly in 12-hour periods that many were led to infer that some relation existed between the volcano's activity and the ebb and flow of the tide. On March 31, 1871, in company with Prof. Gerhard von Rath, I was in Naples and had the opportunity of witnessing this pulsation of Vesuvius. Sometime previous to my visit a secondary crater had been formed on the great cone, without the principal crater and from 60 to 70 m. below the summit. Both craters were in active eruption, the secondary crater glowing at intervals of from six to eight seconds, and the principal crater at intervals of about two minutes. The pulsations of the craters were thus independent, so far as regards time, but as the glowing masses must have come from the same hearth the difference in the rhythm was due to the variation in the structure of the chimneys, probably in the portions near the surface. The analogy with the eruptive phenomena of geysers was very striking. On the following day we were able to enter the smaller crater. In its chimney the molten lava could be seen rising and falling regularly every six or eight seconds; as the mass rose glowing lumps of lava were thrown into the air, and after subsiding a crust was formed on the upper surface only to be thrown out by a new explosion. Clouds of steam hovered over the crater, and fumes of hydrochloric and sulphurous acids were present. The whole aspect was that of a geyser whose eruptions of superheated steam were accompanied by lava ejections.[2] Large blocks of lava were thrown out by the principal crater, and when they fell to the ground they were observed to be coated with a film of sodium chloride. Here we were confronted by the riddle which had long puzzled geologists. The presence of sodium chloride indicated infiltration of sea-water, but how could surface waters penetrate into regions of such great heat? More than 30 years have passed since these observations were made, and the investigation of many of our keenest scientists, notably Silvestri, Mercalli and Bergeat, have thrown new light upon this problem. It is not to be expected that the rhythmical eruptions of geysers and volcanoes should show the same regularity as the pulse-beats of an organic being. The regular eruptions of geysers are interrupted by a series of smaller explosions caused by variations in the structure of the chimney, and it is only when these minor disturbances are eliminated that the rhythm may be recognized. A noteworthy exception is the Old Faithful geyser in Yellowstone Park, whose eruptive periods were observed by Comstock, in 1873, to be as follows, in minutes: 58, 63, 62, 63, 68, 77, 52, 68, 62, 63. The periods, as observed by Peale[3] in 1872 were: 68, 65, 66, 68, 70, 70, 68, 69, 67. According to Bergeat the violent eruptions of the western crater of Stromboli were separated by the following intervals: 42, 23, 5, 17, 20, 46, 51, 30, 19, 26, 23.[4] A glance at the figures indicates that the periods 5 and 17 belong to an interrupted phase, while the longest periods are due to delayed eruptions; but one may assume also that the eruptions have no regularity. It is important to note, however, that this crater is not influenced by the adjacent craters, and that the eruptive process as stated by Bergeat must take place near the surface.

As to the sources of steam given off during eruptions Humboldt remarked the distribution of volcanoes along the sea coast and concluded that there must be a seepage of water from the surface—a view strongly combatted by Cordier

[2] G. von Rath, "Der Vesuv am 1. u. 17 April, 1871." *Zeitschrift* deutscher geologischen Gesellschaft, 1871, pages 702-733.
[3] A. C. Peale, *Annual Report* of the United States Geological Survey, xii, 1883, part ii, page 223.
[4] A. Bergeat, "Die aolische Inseln," Abhandlungen Akademie Munchen, xx, 1899, page 36.

and Gay-Lussac. In further discussing this subject, I shall direct attention to two lines of evidence, one connected with the temperature of lavas and the other with the nature of the accompanying gases.

According to Dolter the lava of Vesuvius becomes fluid at a temperature of 1,090°; the molten lava ejected in 1871 contained crystals of leucite, whose melting point is 1,310°. These temperatures—1,090° and 1,310°—represent therefore the maximum and minimum of heat within the chimney, but it may safely be assumed that the temperature of the boiling lava did not much exceed 1,090°, for the walls of the crater formed of the same rock showed no indications of fusion. Under these conditions we may venture to express the view that the ascending gases were the carriers of heat and caused the fusion of the lava; and we are supported in this view by other circumstances, such as the heavy detonations which accompany violent volcanic eruptions and which must be regarded as due to the sudden condensation of steam upon its entrance into cooler regions. During such outbreaks the explosions gradually become more frequent until the white clouds of steam appear, which are followed by boiling lava mixed with steam. At any rate, the steam ejected by Vesuvius must have come from a zone whose temperature equaled or exceeded the melting point of most rocks, and it could not therefore have originated from vadose infiltrations.

The most important gases ejected by volcanoes are steam, chlorine, sulphurous gases and carbon dioxide, all of which show some regularity in their appearance. Fumaroles, so far as they have been investigated, are accompanied by steam, the hottest ones being dry. In those of exceptionally high temperature chlorine compounds, as well as fluorine, boron and phosphorus, are found. With a fall in the temperature these elements become less important, but sulphur and often arsenic are still found in the emanations, while carbon dioxide, which is present in the hottest fumaroles, is emitted even when they have become quite cool. Occasionally different vents in the same region exhibit different phases of eruption. In 1901 the principal crater of Vesuvius ejected clouds of steam which was accompanied by hydrochloric acid, while the steam given of from the smaller veins along the sides of the cone was free from acids or at most contained only small quantities. In the Phlegræan Fields there are steam, arsenic and sulphur solfataras.

The steam ejected by volcanoes cannot be traced to vadose infiltration. Both the steam and the carbon dioxide have their origin in the remote interior of the earth; they give proof of the constant escape of gas from this planet—a porcess that has been going on since the first formation of the crust, and which has not yet ceased. The ocean and the entire hydrosphere have been formed in this way, and we must recognize that volcanoes are not dependent upon the infiltration of sea water, but, on the other hand, the sea increases its volume with each eruption. This view is not new, it is inseparable from our conceptions of the earliest phases of the formation of the earth. The French geologists seem to have been the first to give it support, but it has since been championed by Tschermak and many others. Additional evidence in support of this view is found in the commonly observed phenomenon of the escape of free hydrogen from volcanic vents. Accepting these conclusions, we are prepared to adopt the view of Sainte-Claire Deville that the chimneys of volcanoes are places where oxidation processes are carried out, and that the greater part of those chemical compounds occurring in the form of volcanic products have their origin near the surface. Just as with hydrochloric acid, sulphurous acid and similar compounds, the water is formed in the upper part of the volcanic chimney; and in this way the vadose waters of the earth's surface are increased by new supplies of what may be called *juvenile* water. In the same manner juvenile carbon dioxide, juvenile sodium chloride and other compounds come into existence, and here possibly lies the explanation for the fact that the hottest fumaroles are dry.

We may now inquire whether eruptive springs carry vadose or juvenile water. That such springs occur only in regions of recent vulcanism is well known. In Iceland the connection between the hot sulphur and alkaline springs, as well as the pulsating eruptive springs, and volcanic eruptions is so close that there is no reason for doubting the identity of the two classes of phenomena. As to Yellowstone Park, where there are 160 geysers and thousands of hot springs, I call attention to two facts: First, that sulphur and arsenic are deposited by certain springs which could not have derived these elements by leaching of the rock formations; secondly, that the activity of all of these springs has been subsiding for more than a year, without any relation apparently to the rainfall.

The hot springs of Iceland are the natural result of the cooling of a buried lava-mass, the emanations from which are too weak to cause a volcanic outburst, or they may represent the initial stages of an eruption. It is quite possible that vadose waters are caught up and carried to the surface by the springs, but their circulation downward ceases when they come in contact with the hot waters from below. It is also imaginable that under certain conditions, such as a decrease in the volume of ascending gases, the vadose infiltrations will penetrate to greater depths and with a renewal of activity they may form a considerable proportion of the outflow. But in any case the contributions from vadose sources play a subordinate role; the essential principle of the hot springs rests upon the ascension of juvenile materials, the "apport interne."

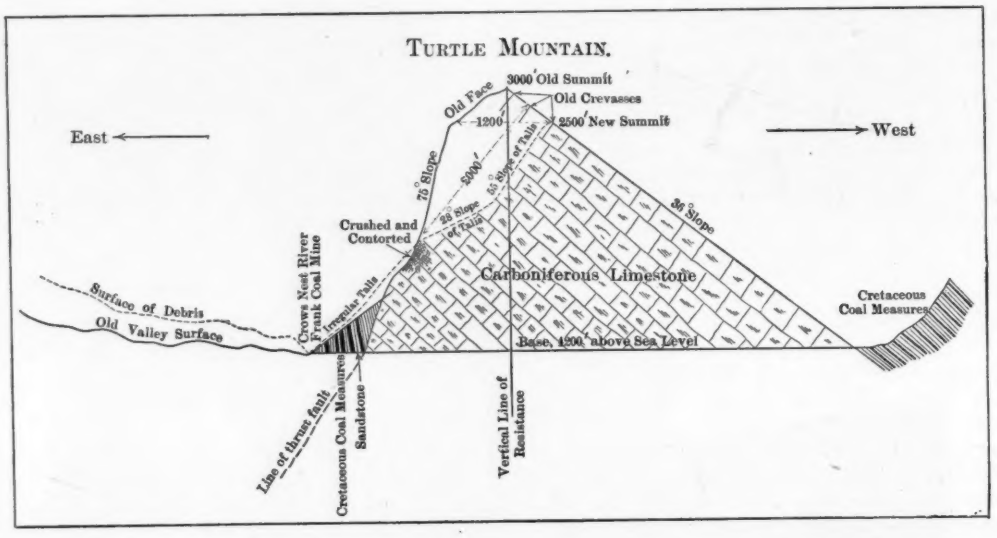
(To be Continued.)

ELECTRIC HOISTS.—Recently at a small colliery, near St. Helens, England, a hoisting engine was put up to be operated by electricity furnished by the lighting plant of the corporation. The hoist was a small one, the depth of the shaft being about 210 ft., and the amount of coal raised daily 70 tons only. About the same time, another small colliery was started with a steam-hoisting engine. The quantity of coal raised was about the same, but the depth of the shaft was about 240 ft. A comparison of the costs of the two engines showed the cost of the electric hoisting per ton of coal raised was only about one-third of that of the steam hoist.

THE TURTLE MOUNTAIN ROCK SLIDE.

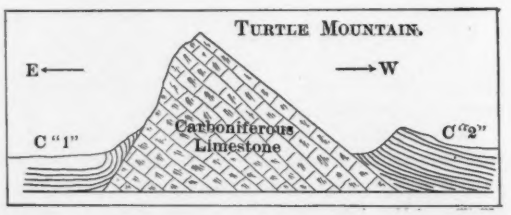
By Walton E. Dowlen.*

The center and highest peak of Turtle Mountain, at Frank, in Alberta, Canada, fell away on April 29 last, and shot down the mountain side, passing over the foothills which contain the coal measures. It spread out in broken fragments over the valley below, so as to cover 7,000 ft. of the Canadian Pacific Railway Company's track, with loss to life and property. Shortly afterward Mr. A. E. Spriggs, director of the Canadian American Coal & Coke Company, visited the top of Turtle Mountain, and reported that he considered it quite safe for the inhabitants of the town to remain. The engineers of the Canadian Pacific Railway concurred in this opinion. They commenced to rebuild that portion of the track which had been destroyed, this being successfully accomplished under the superintendence of Mr. Taylor, the division superintendent, in the record time of 14 working days, so that the transcontinental trains were able to pass over the new track 17 days after the slide happened.



Mr. H. L. Frank and Mr. S. W. Gebo, the president and general manager, respectively, of the coal company above mentioned, reached the scene of the catastrophe four days later, the former gentleman remaining there three weeks and rendering personal assistance in the work of reparation, while Mr. S. W. Gebo started the re-opening and development of the mine on a large scale.

Examinations of the mountain were at once commenced by Mr. Ellacot, the Territorial Government engineer; Mr. F. B. Smith, the Territorial Government mine inspector; Messrs. McConnell and Brock, geologists of the Dominion Government; and the writer, on behalf of the Canadian American Coal & Coke Company.



Turtle Mountain might be described as a freak in rock upheavals, with phenomenal conditions highly conducive to a weakening process, both chemical and mechanical. It is a narrow ridge of Carboniferous limestone, that has been forced up and through the overlying Cretaceous coal measures like a wedge, the thin end of which has crumbled and broken by disintegration, for 2,500 ft. at the center, into three peaks, the highest and center one standing

* Consulting Engineer to the Canadian American Coal & Coke Company, Limited.

fully 500 ft. above the North peak on one side and the South peak on the other.

Following along this ridge, from the north to the south, the horizontal distance is about three miles, and a vertical height gained, near the center, of 3,000 ft.; the perimeter along the west side is very irregular, while that along the east side is regular and clear cut, with a precipitous face, looking down upon the town of Frank, the coal mine and the railway.

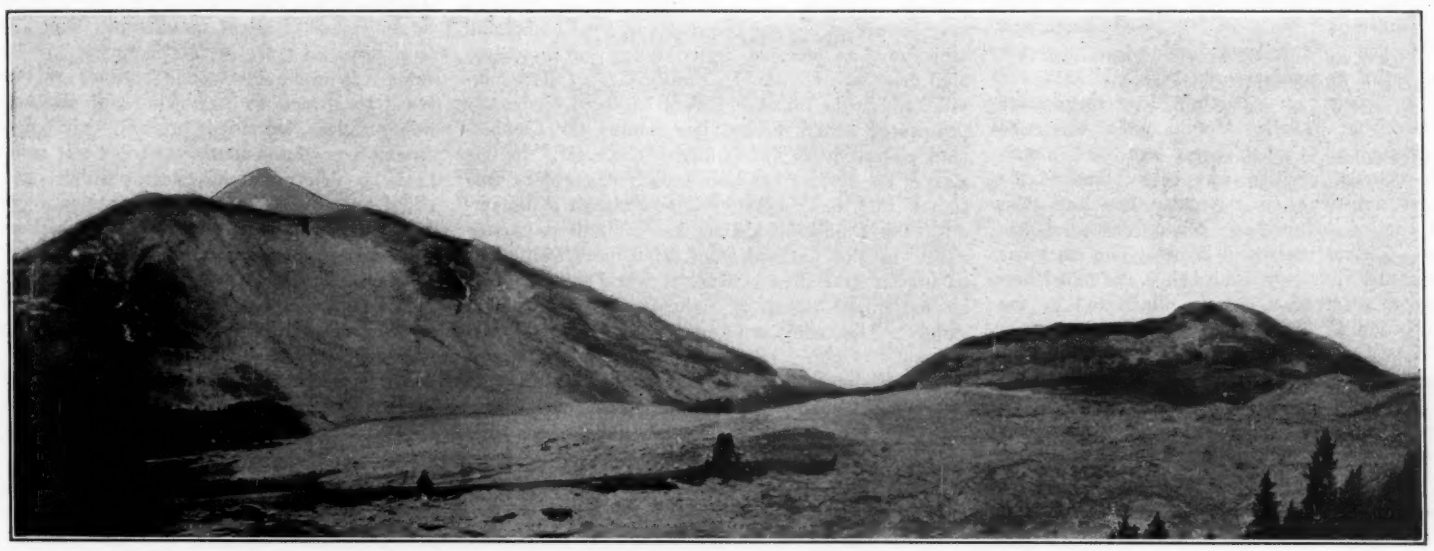
The horizontal measurements through the base from east to west vary greatly; in many places it is 7,000 to 8,000 ft., while directly under the highest and central peak it is barely 6,000 ft.; the highest peak, rising abruptly 3,000 ft. above the town, stood on the narrowest base, scarcely 6,000 ft.

The accompanying vertical section of the highest peak of Turtle Mountain, taken on an east and west line, shows an angle of slope on the east face of 75°, for a length of 1,000 ft. or more. In approaching the base the slope is less steep. These angles of inclination follow the line of original fracture or thrust-fault, which marks the uplift of the body of limestone from its original horizontal bedding plane. The back or west face runs fairly uniformly at a slope of about 36°, this represents the true dip slope, that is, the inclination of the bedding of the limestone. It will also be noted that this rock structure gives the east face a somewhat overhanging appearance, with a block of the mountain behind it. This block contained an enormous tonnage, calculated at closely upon 80,000,000 tons. It stood upon an insufficient base and, therefore, exerted a greater crushing energy at the foot, and greater straining at the center of the mountain. These conditions account for two facts, namely, (1) The highly contorted and shattered condition of the limestone at the base of the precipitous east face; (2) the crevasses on the west face, several hundred feet back from the summit, which, it is now learned, existed some years ago. The rapid disintegration characteristic of limestone under extreme atmospheric conditions, made the third great factor which gradually, but surely, weakened the already unstable rock structure along its vulnerable lines of lamination, jointing planes and crevasses, until the strain became greater than the resistance, and, at 4.10 a. m. on April 29, 1903, culminated in an awful calamity.

The dimensions of the peak that thus broke away are about 2,000 ft. across the face at the longest point, about 2,000 ft. greatest vertical height, and a greatest thickness of 1,000 ft.

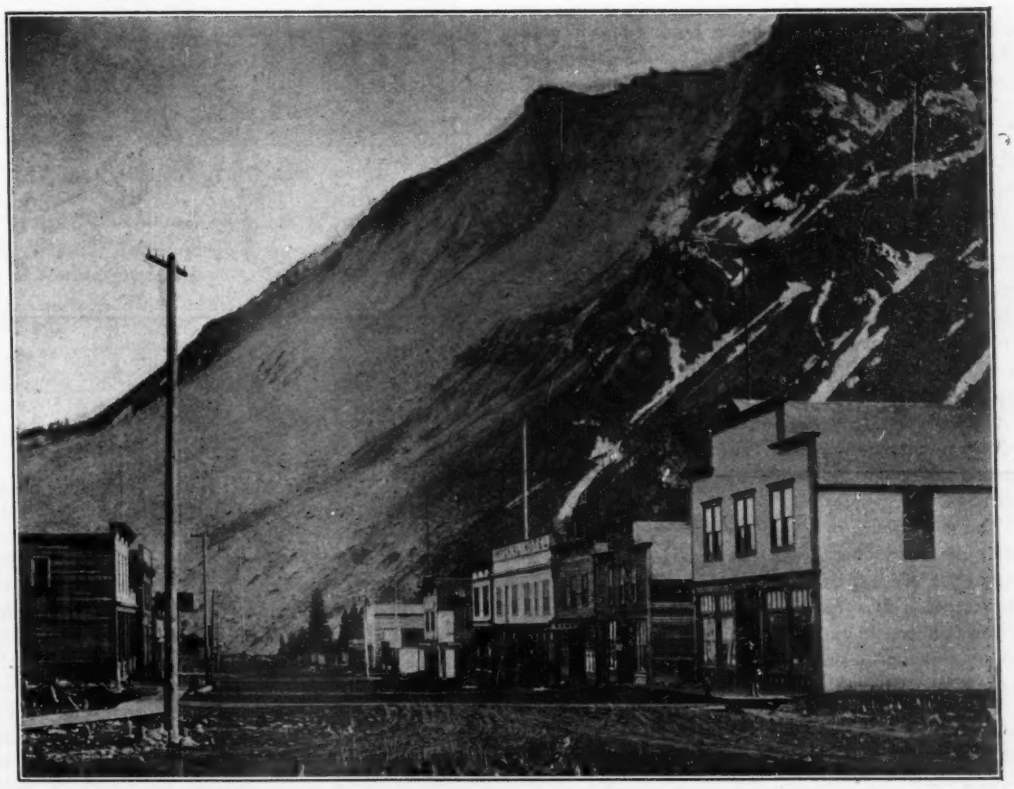
From the top of the mountain to the extreme end of the debris, across the valey below, and 400 ft. up on this side, is about 1¾ miles horizontally, and a vertical fall of about 3,000 ft.; the area covered by the debris is 1¾ square miles, and is of an average thickness of about 30 ft., while in some spots it is piled 100 ft. high.

It has been stated authoritatively, that the sudden tearing away of this enormous mounatin peak might have been hastened by the coal mining operations carried on at Frank. This, surely, though a careful and non-committal statement, was premature, as, at that time, no examination of the mine itself had been made. Since then, however, the main entry of the mine has been reopened, and the writer has made an inside examination, finding the workings absolutely intact. Various miners who were at work at widely separated points underground at the time of the slide, and who all found their way to the surface safely, have made certain affidavits stating that their first intimation of what was afterwards learned to be the slide, was a very loud rumbling noise, like the beating of drums, and this was followed by a great inrush of air, which put out all their lights; then came the tumbling of small fragmentary limestone rocks and dirt down the narrow openings and manways that lead up to the surface. This told them precisely what had happened. They lit their lamps and ascended one of the manways, but found it blocked with fragments of limestone and dirt, they then descended to the lowest level or main entry and walked a mile to the mouth. They found this also blocked about 40 ft. from the entrance. This determined them to clean out the dirt at a manway near the mouth of the main entry, which was successfully accomplished, daylight being gained 13 hours after the slide took place, without the slightest injury to any of them. Just one month afterwards, the main entrance was re-opened, and a party of ten, including the superintendent, Mr. S. W. Gebo, Mr. A. Doise, Mr. Bernard and the writer, went into the extreme end, and we found, as stated above, that the mine was in splendid condition, one of the horses being alive, after a fast of 31 days, which is remarkable testimony to the fact of there having been always a good circulation of air in the mine. Incidentally, it demonstrates the stability of the solid sandstone casings, which stood the tremendous pressure exerted by the impact of 80,000,000 tons of rock within a distance of 800 or 900 ft.



VIEW OF TURTLE MOUNTAIN, SHOWING SLIDE AND DEBRIS ACROSS VALLEY.

The old summit is shown by the faint lines; the cross in center shows position of town.



TURTLE MOUNTAIN AND TOWN OF FRANK AFTER THE SLIDE.

Sufficient evidence has been deduced from the foregoing to show that the mining operations at Frank bear no relation whatever to the rock slide, but it will be well to draw attention (in view of so many public statements having been made that a creep in the mine was the probable cause) to a feature of the rock structure, hitherto apparently overlooked or disregarded, which offers still better evidence, if such is possible; and proves, even if the sandstone walls of the coal seam now being worked are allowed to come together by the entire extraction of the coal, that the weakening effect on Turtle Mountain would be inappreciable. Turtle Mountain is composed of limestone, of Carboniferous age, and therefore, its original position was below that of the Cretaceous sandstone, shales, coals, etc. Both formations are of sedimentary origin, deposited one upon the other, in horizontal layers. The mass has been uplifted by pressure from below and tilted into the position observed to-day, as illustrated by the vertical section B. This shows that the Cretaceous rocks, directly overlying the limestone, at and about the central area of disturbance were badly shattered and crumbled and then eroded, leaving the limestone exposed in the position of an extruding wedge, with the Cretaceous series overlying it at contorted angles, near to the point of disturbance, but gradually resuming their horizontal position on either side as distance is gained from the point of uplift. Therefore, if the Cretaceous rocks, at points marked C.1 and C.2 on section B, were entirely removed by mining operations, the limestone intrusion of Turtle Mountain would not be affected thereby, and would stand precisely on the same base as it stands to-day.

So many public statements have been made as to the danger that overhangs Frank and its inhabitants from further rock slides, that it is considered advisable to say that careful surveys and examinations have been made of the remaining peaks, and bi-weeky observations are being taken, so as to detect any creeping movement that might take place, and, in the meantime, all dwellings that are within the possible danger zone, are being removed to a point absolutely safe, three-quarters of a mile from their present position.

The writer examined the top of Turtle Mountain five times during a three weeks' stay at Frank, and placed twelve reference cement mounds at points where movements can be readily detected. During that time there was no shifting whatever. The crevices now existing on what is termed the North Shoulder are exceedingly small, affecting an area equal to scarcely one-tenth of the tonnage that has already fallen. They also distinctly show that they are quite new, and the result of the wrenching, and tearing away of the larger mass; while, therefore, it is improbable that any movement will be detected for some years to come, nevertheless, by the system of measurements and observations now in force, the greatest possible insurance against danger is now obtained.

The coal company resumed operations a few days after the slide, on the work of repair and the opening of the mine at two new points, 3,780 ft. and 5,780 ft., respectively, from the old opening, at which places it is considered absolutely safe, and out of any possible danger from further rock slides. The shipment of coal has been recommenced.

THE HOEPFNER ELECTROLYTIC PATENTS.—Formal notice is given that the patents, on various electrolytic processes, issued to the late Dr. Carl Hoepfner, which have been owned since his death by his sister and heiress, Fraulein Anna Hoepfner, have been conveyed to the Gesellschaft fur Metallelectrolyse mit Beschrankter Haftung, whose office is at Siegen, Germany. The company gives notice that it is prepared to grant licenses to work under the patents named; the business being in the hands of Messrs. Hugo Steinmeister and Gustav Menne in Siegen.

THE BARBOURSVILLE OIL-FIELD, KENTUCKY

By S. W. McCallie.*

The Barboursville oil-field is situated in the extreme southeastern corner of Kentucky, only a short distance from the Kentucky-Tennessee State line. The most productive part of the field is found along the several tributaries of the Cumberland River, in the vicinity of Barboursville, the county site of Knox County. Physiographically considered, the oil-field may be said to be near the center of the Cumberland table-land, an elevated region noted for its extensive deposits of coal. In the vicinity of Barboursville, where the oil development has been vigorously prosecuted within the last few months, the Cumberland plateau loses its distinctive character. In this district the surface has been greatly changed by erosion so that the topography is now almost mountainous. The Cumberland River has cut a deep, narrow valley in the Carboniferous sandstones, while its tributaries have been actively at work eroding similar but minor valleys at right angles to this main valley. The combined effects of these several streams has given rise to a rough, broken region with hills and ridges often attaining an elevation of 300 or 400 ft. above the general stream level.

Oil has been known to exist in the Barboursville District for many years, but it is only within the last two years that there has been any serious prospecting. The first producing well to attract widespread attention was what is known as the Jones gusher, brought in on Christmas day, 1901.

This well is located on Little Richland Creek, about 6 miles northwest of Barboursville. When the oil sands were first struck, the oil was forced up with great violence, partially wrecking the drilling rig and spraying everything in the immediate vicinity. The well continued to flow for some time, but the pressure gradually diminished until the flow finally ceased.

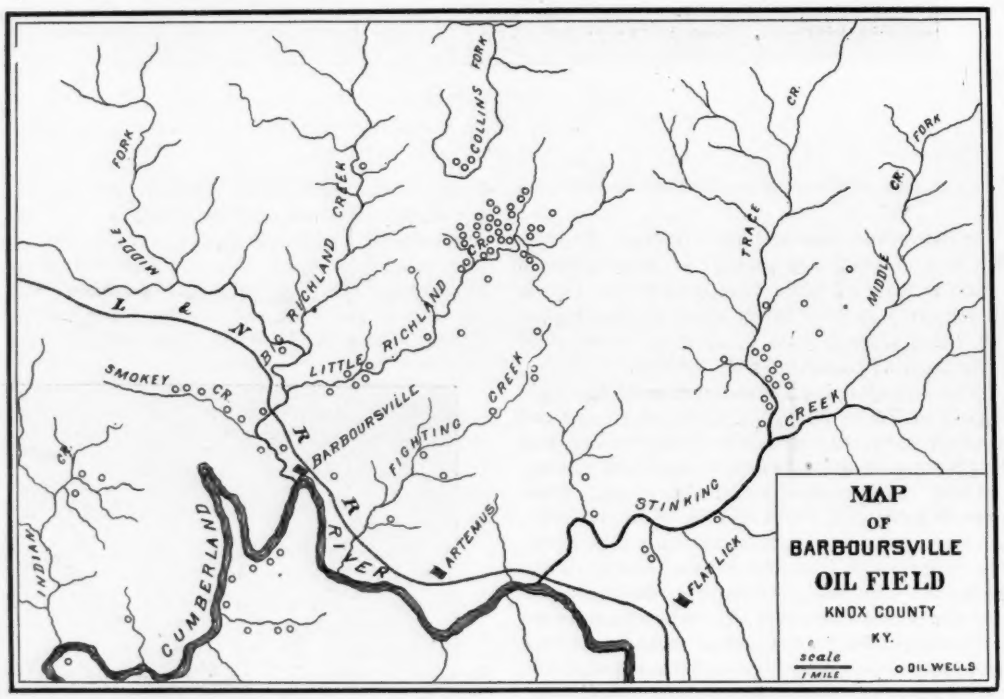
The successful completion of this well was soon followed by that of others equally promising. Wells were also put down on Big Richland, Stinking, Smokey and Indian creeks, and most of them, although pumping wells, became producers of some importance.

At the time of the writer's visit to the district, about three weeks ago, the number of wells put down was estimated at 200, many of which were producing from 20 to 40 barrels of oil per day. The life of these wells cannot at present be determined with any degree of accuracy, owing to the short time the field has been opened up.

The total oil output of the Barboursville District up to April 1 was about 30,000 barrels. The production at present is 8,000 barrels per month, all of it being purchased by the Standard Oil Company, which has erected large storage tanks in the district, and has extended pipe-lines to all parts of the field.

The structural geology of the region is similar to that of other portions of the Cumberland plateau. The strata are nearly horizontal, but they appear to be subjected to slight undulations, which give rise to a series of more or less irregular, low, anticlinal folds. In some instances, the axes of these anticlinal folds seem to correspond with the axes of the minor valleys, but this is probably only true of those having a northeast-southwest trend. It is often difficult to determine the exact position of an anticlinal axis owing to the limited surface exposures. Nevertheless, the drill records will yield important evidence concerning this important economic problem.

The surface rocks of the region consist of sandstones and shales with several coal-seams, some of which are workable. These rocks belong to what has been termed the Lee formation, the basal portion of the coal-bearing rocks of western Kentucky. The sandstones are often heavy bedded, and occasionally coarse-grained, passing into conglomerates. The shales are usually siliceous, and, at points, carry a good deal of iron carbonate in the form of concretions. Both the sandstones and the shales contain plant remains, which increase in number as the coal seams are approached.



The lowest productive coal seam in the district appears to be one outcropping along the sides of the minor valley from 30 to 100 ft. above the general stream level. Other seams are reported in the various wells to a depth of 100 ft. or more. However, they appear to be chiefly small partings in the sandstones and shales.

The deeper formation of the Barboursville District is revealed by borings, as indicated by the notes from one of the Knoxville Oil Company's wells, given herewith.

Deeper borings in the district show that limestone is struck at a depth of from 1,000 to 1,200 ft. If this limestone, as has been suggested, is the Newman limestone, the oil sands of the district occupy a geological position midway between this formation and the productive coal measures, thus placing them in a position corresponding to the Pennington shale, and therefore sub-Carboniferous in age. The Pennington shales, however, as studied by Mr. M. R. Campbell, of the United States Geological Survey, in eastern Kentucky, are usually highly calcareous

* Assistant State Geologist, Atlanta, Ga.

and often carry thin beds of limestone, rocks quite unlike those shown in the section given by the well above quoted.

Log of Knoxville Oil Company's well No. 1:

	Character of borings.	Thickness. Feet.	From. Feet.	To. Feet.
1	Dark carboniferous shale	90	0	90
2	Fine gray sandstone	20	90	110
3	Dark gray, fine grained sandstone	90	110	200
4	Fine grained gray sandstone, wages oil sand	15	200	215
5	Dark carboniferous shale	25	215	240
6	Sandstones and black shale	25	240	265
7	Gray medium grained sandstone marked conglomerate	10	265	275
8	Brownish gray fine grained sandstone	70	460	540
9	Fine grained gray sandstone, marked Jones' sand	40	300	340
10	Black shale with some sandstone	78	340	418
11	Gray fine grained sandstone, marked Anderson sand	42	418	460
12	Dark shale and fine grained sandstone	70	460	535
13	Gray fine grained sandstone ...	5	535	550
14	Brownish fine grained sandstone	10	540	550
15	Medium fine grained brownish sandstone, oil bearing	5½	550	555½
16	Brownish sand carrying salt water	25	555½	575½

As far as the writer's own knowledge extends, nothing more definite can be stated at present as to the exact position of these oil sands, than that they

ATLANTIC & PACIFIC OIL COMPANY'S WELLS, NEAR BARBOURSVILLE, KY.

occur from 300 to 700 ft. below the productive coal seams, and that they belong probably to the upper division of the sub-Carboniferous strata.

There are two main oil-bearing sands known as the Wages and the Jones sands. In addition to these two main layers there are others reported of less importance. The Wages sands, as shown in the above log of the Knoxville Company's well, occur at a depth of only 200 ft. from the surface and have a thickness of 15 ft. It is a fine-grained gray sandstone, with the individual grains well rounded. The Jones sand differs but little from the Wages sand. However, in the above-named well it attains a much greater thickness, being estimated at 40 ft. The other sand given in the log as being oil-bearing has a brownish color, due apparently to a stain of hydrocarbons. It has a thickness of 5.5 ft., and consists of medium fine-grained water-worn quartz-sand. The oil sands are said to differ greatly in thickness from place to place, and at some points are entirely wanting or non-productive.

The oil varies somewhat in quality, yet it is all classed as illuminating oil, and readily sells, in the tanks at the wells, at from 95c. to $1 per barrel. In addition to the oil, there frequently occurs considerable gas. In some instances the gas is in sufficient abundance to be of commercial importance, but at present no attempt has been made to utilize it, except as fuel in the boilers used in operating the drills.

UTILIZING BLAST-FURNACE GASES.—The Elsassische Machinenfabrik, of Mulhouse, Germany, have lately completed five blast-furnace gas engines on the De La Mar-Deboutteville system, for the works of Messrs. De Wendel & Co., at Hayingen, Lorraine. Three of the engines, of 600 h.p. each, will be used for blowing purposes, while two, of 1,200 h.p. each, are intended to drive dynamos in connection with the lighting and power plant.

ESTIMATION OF CYANIDE IN CYANIDE SOLUTIONS.*

By J. E. CLENNELL.

1. ESTIMATION OF FREE CYANIDE.

No really accurate method of estimating this quantity in presence of zinc has hitherto been published.

Differential Method.—Where zinc is the only metal present which is capable of forming easily decomposable double cyanides of the character of $K_2Zn\,Cy_4$, a determination of the so-called "total cyanide" by the method given below, together with a determination of the zinc, enables us to calculate the free cyanide, assuming 1 part of zinc equivalent to 4 parts of KCy converted into K_2ZnCy_4. In this case

$$\text{Free Cyanide} = \text{Total Cyanide} - 4 \times \text{Zinc}.$$

The presence of cyanogen, in the form of ferro-cyanides or thiocyanates, does not affect this result.

With Iodide Indicator in Neutralized Solution.—The following method is one which I have found to give results closely agreeing with theory in certain cases, but I am not yet prepared to say whether it can be universally applied.

The "protective alkali" is first determined according to Green's method.[1]

Another portion of the solution is taken, say, 50 c.c., and the alkalinity neutralized by the careful addition of the exact amount of $\frac{N}{10}$ nitric acid shown to be necessary by the preceding test. From 5 to 10 c.c. of neutral 1 per cent potassium iodide are then added, and the solution titrated by adding silver nitrate (slowly, drop by drop, when approaching the point) until an *unmistakable white turbidity* remains permanent on agitation and standing for half a minute. No notice should be taken of an obscure cloudiness which may occur at an earlier stage and which generally clears on standing. The actual point may be observed with sufficient sharpness for practical purposes.

By rendering the solution alkaline and continuing the titration with silver nitrate, the total cyanide may be estimated in the same portion of the original solution.

2. ESTIMATION OF "TOTAL CYANIDE."

Strictly speaking, the term "total cyanide" should indicate the equivalent of all the cyanogen contained in the solution. Practically, however, it is generally taken to mean *the equivalent, in terms of potassium cyanide, of all the cyanogen existing in the form of simple cyanides, hydrocyanic acid, and certain readily decomposable double cyanides, such as that of zinc.* Some other double cyanides, such as those of silver and copper are generally excluded, together with ferro and ferri-cyanides, thiocyanates and similar bodies.

Method Based on Use of Alkaline Iodide Indicator.—This is by far the simplest and most satisfactory method for ordinary use, and is carried out as follows:

An indicator is prepared by dissolving 40 grm. of caustic soda and 10 grm. of potassium iodide in water, and making up to a liter.

Fifty c.c. of the cyanide solution are taken, and 5 c.c. of the above indicator added. The liquid is titrated with standard silver nitrate (6.519 grm. per liter) until a distinct yellow coloration is obtained, disregarding any white turbidity. This latter may sometimes be removed by adding ammonia, which, in moderate amounts, does not affect the accuracy of the test:

1 c.c. of $AgNO_3$ used = 0.01 per cent KCy (equiv. to total cyanide).

Method Based on Decomposition of Double Cy-Cyanide by Means of Alkaline Sulphides.—This method determines not only the cyanogen existing in combination with zinc, but also that present as double cyanide of silver and some other metals.

A slight excess of a pure, fairly concentrated solution of sodium sulphide is added to a measured volume of the liquid to be tested, well shaken, and the solution made up to a definite volume. A little lime is added to assist settlement. The liquid is then filtered, and lead carbonate added to the filtrate in small quantities at a time, with agitation, as long as a black coloration is produced. An aliquot part is then filtered off, and titrated with addition of 5 c.c. of alkaline or ammoniacal potassium iodide (1 per cent KI). From the number of c.c. of silver nitrate required it is easy to calculate the "total cyanide" present in the original solution.

The results are generally a trifle low, owing probably to the fact that zinc sulphide is not quite insoluble in alkaline cyanides, and to the fact that a small quantity of cyanide becomes converted into thiocyanate by the action of the sodium sulphide. For this reason the lead compound should be added *immediately* after filtration.

Method Based on Decomposition of Double Cyanides by Iodine, in Presence of an Excess of Ferrocyanide.—The "iodine method" of Fordos and Gelis (*Journal de Chimie et de Pharmacie*, 23, 48) is generally useless for titration of working cyanide solutions, owing to the interference of zinc, although it gives good results in the absence of that metal, and of bodies other than free cyanide capable of re-acting with iodine.

The following modification of it gives in some cases accurate results for determination of total cyanide. It is not satisfactory with complex solutions, giving indefinite and somewhat low results.

The "protective alkali" is first determined by the method already referred to.

A fresh portion of the liquid to be tested is then taken, and $\frac{N}{10}$ acid added in quantity just sufficient to neutralize the protective alkali. A moderate excess of potassium ferrocyanide is now added, and the resulting liquid titrated, without filtering, by adding standard solution of iodine in potassium iodide until a permanent tint remains. A few drops of starch solution may be added towards the finish. The zinc is precipitated as ferrocyanide, the reaction being apparently as follows:

$$2ZnK_2Cy_4 + K_4FeCy_6 + 8\,I_2 = Zn_2FeCy_6 + 8KI + 8ICy.$$

The standard solution required for this purpose may be conveniently checked by means of a solution of pure potassium cyanide (freed from alkali, if

* Abstract from "Analytical Work in connection with the Cyanide Process," by J. E. Clennell. *Proceedings* of the Institution of Mining and Metallurgy. London, May 21, 1903.

[1] As published in the ENGINEERING AND MINING JOURNAL of June 27, 1903, page 968.

necessary, by adding the required amount of $\frac{N}{10}$ acid), the strength of the cyanide solution having been accurately ascertained by Liebig's method. The value of the iodine solution is thus made to depend on the accuracy of the standard silver solution. For cyanide testing, this method of standardizing is more convenient than the usual method with thiosulphate, and probably quite as accurate, if not more so, since silver nitrate is easily obtained in great purity.

To prepare the starch indicator, one part pure starch is rubbed into a thin paste, with a little water, then gradually poured into 150 to 200 parts of boiling water, the boiling continued for a few minutes and the liquid then allowed to stand and settle. The clear solution only to be used. Starch does not generally give a blue color with iodine in cyanide solutions, but rather a light violet tint.

Gravimetric Estimation, by Precipitation as Silver Cyanide.—The following method, due to H. Rose, is a simple and accurate means of determining total cyanides in such cases where only free cyanide, hydrocyanic acid, and double cyanides such as those of zinc, copper and silver are present. Chlorides interfere with the method. Sulphocyanides if present would be determined as free cyanides. Ferrocyanides interfere; when they are present other methods should be used.

An excess of silver nitrate (of any strength) is added, and the mixture digested for some time with stirring. Nitric acid is then added in moderate excess, and the digestion continued at a gentle heat until the decomposition is complete. The whole of the cyanogen is now present as silver cyanide, which may be collected and washed on a weighed filter and dried at 100° C., or the precipitate may be ignited for a quarter of an hour in a porcelain crucible and weighed as metallic silver. The latter procedure alone can be used in presence of thiocyanates, as in this case the cyanogen present as —SCy is precipitated as AgSCy, not as AgCy. If ferrocyanides had been present the precipitate would contain ferrocyanide of silver, and on ignition this would leave oxide of iron, thus interfering with the determination.

BISMUTH.*

By JOSEPH STRUTHERS.

The production of bismuth ore in the United States during 1902 amounted to 37.5 short tons, as compared with a marketed output of 318.6 short tons in 1901. The entire production during 1902 was obtained from the Ballard Mine, Colorado, and none of the output was sold during that year. The production during 1901 was purchased by the Leadville Sampler, at Leadville; the State Ore Sampling Works, at Denver; or was shipped direct to Johnson, Matthey & Co., Limited, England.

Bismuth occurs both free and combined in many of the Western States. In Colorado it has been found as metallic bismuth, bismuth carbonate, bismuth telluride and bismuth tellurate. A recent discovery of bismuth carbonate ore is reported in Arizona, on Salt River, near its junction with the Verde River, between Fort McDowell and Superstition Mountain, and excellent specimens of bismuth tellurate (the mineral montanite, $Bi_2O_3.TeO_3.2H_2O$) have been obtained from Salida, Chaffee County, Colo. Bismuth ore varies greatly in composition. That produced during 1901 assayed from 4 to 12 per cent of bismuth, from 1 to 2 oz. gold, and from 5 to 6 oz. silver per ton. That produced in 1902 contained from 7.8 to 27.1 per cent of bismuth, from 3.5 to 22.6 oz. gold, and from 3.45 to 3.5 oz. silver per ton.

The production and price of bismuth and its ores continue under the control of Johnson, Matthey & Co., Limited, and the Government of Saxony—a combination of interests formed in order to maintain for the products a price at which the mines could be operated with profit. The supply of metallic bismuth far exceeds the demand, and unless the output be restricted the price would fall to a point which would render the manufacture of the metal no longer profitable. The schedule of prices of ore is based on the market price of the metal. The latest published figures for Colorado, with metal at $1.25 per pound, were: Ten per cent ore, $150 per ton; 15 per cent ore, $250 per ton; 20 per cent ore, $350 per ton; 30 per cent ore, $550 per ton; 40 per cent ore, $750 per ton; 50 per cent ore, $1,000 per ton.

The price in the United States for the bismuth content of the ore varies from $8 to $11 per unit, the producers being paid also for the gold and silver contents. No price was quoted for the output during 1902, but as near as can be ascertained the value of the output in 1901 was $80 per ton, not including charges for transportation or treatment. The wholesale price for metallic bismuth throughout 1902, f.o.b. works, was $1.50 per pound.

Bismuth is usually found in ores containing other metals which render its extraction somewhat complex. The trade and the price being under control and the domestic demand being comparatively small, the erection of new works to manufacture and refine this metal in the United States is hardly attractive from a commercial point of view.

The imports of metallic bismuth into the United States in 1902 were 190,837 lb., valued at $213,704, as compared with 165,182 lb., valued at $239,061, in 1901. There was also imported a small quantity of bismuth salts in pharmaceutical compounds.

The metal bismuth is utilized chiefly in the manufacture of alloys which melt at comparatively low temperatures, and are, consequently, of great value for special purposes, such as safety plugs for wire circuits carrying electric current, safety plugs for steam boilers, light solders, amalgams in dentistry for filling cavities in teeth, for taking impressions of woodcuts, coins, etc., and as a tempering bath in steel works. The chief alloys of bismuth used on account of their low melting points contain bismuth, lead, tin and cadmium.

Bismuth forms a constituent of many alloys used for making anti-friction metals, pewter and type metal. In the last two instances the property which it possesses of expansion at the moment of solidification (amounting to 2.35 per cent of its volume while molten) causes the solidifying alloy to take a sharp impression of the inclosing mold. A small quantity of the metal is used in the preparation of the salt, bismuth subnitrate, $BiNO_3(OH)_2$, which is used in medicine and as a cosmetic.

* From advance sheets of "Mineral Resources of the United States;" published by the United States Geological Survey.

ANTIMONY.*

By JOSEPH STRUTHERS.

The process of smelting antimony ores and refining the metallic product is very difficult, and few metallurgists know the complete details of modern practice. Successful smelting, therefore, can be accomplished only under special conditions. This fact, together with the large production of the metal in foreign countries, the removal of the duty, in April, 1902, on crude antimony (which is partly refined antimony sulphide), and cheap ocean freight rates, precludes the profitable treatment of domestic antimony ores in the United States. The control of the production and trade in antimony continues to remain in the hands of Mathison & Co., of London, which firm operates the smelting plant at Chelsea, Staten Island, New York, and the works of the affiliated concern, the Chapman Smelting Company, of San Francisco, Cal.

The sources of supply of antimony for consumption in the United States are four in number, here given in the order of their importance:

1. Hard lead, derived from the smelting of foreign and domestic ores.
2. Regulus or metal imported into the United States.
3. Antimony ores imported into the United States.
4. Antimony ores from domestic sources.

The quantity of hard or antimonial lead produced to the smelting of foreign and domestic lead ores in 1902, was 20,970,000 lb., containing approximately 5,808,000 lb. of metallic antimony, as compared with 17,878,000 lb., containing approximately 4,469,500 lb. of antimony, during 1901. Hard lead is used for the manufacture of various alloys, and is an important source of the antimony consumption in the United States.

During 1902 the net imports of foreign antimony, as regulus or refined metal, amounted to 5,388,739 lb., valued at $333,601, as compared with 3,640,505 lb., valued at $254,529, for the year 1901.

The antimony content of ores imported varies from 35 to 65 per cent, and for practical purposes the average antimony content may be taken at 52.5 per cent. Assuming a smelting extraction of 42 per cent, the quantity of antimony derivable from the net importation of foreign ores during 1902 was 1,314,000 lb., as compared with 706,566 lb. in 1901.

The quantity of antimony metal derived from domestic ores during 1902 was nil, as compared with 100,000 lb. during 1901. The production of metal from domestic ores has always played a very unimportant part in the quantity of antimony needed to supply the consumption in the United States.

The aggregate quantity of antimony from the above-mentioned sources available as metal or as alloy in the United States during 1902 amounted to 12,510,739 lb., as compared with 8,916,671 lb. during 1901.

The only antimony ore of commercial importance in the United States is stibnite, antimony trisulphide (Sb_2S_3). Although many deposits of the mineral occur in the Western States, the production of metal from domestic ore has never reached an important position, the largest quantity produced in one year being but 295 short tons in 1895 in an estimated total production of 4,000 tons of metal from all sources. Since 1895 the production of antimony from domestic ores has declined until there was practically none so produced in 1902, as compared with 50 short tons in 1901.

The quantity of ore imported has increased from 116,495 lb. in 1893 to the maximum quantity of 6,089,134 lb. in 1900, a year in which there was a marked over-importation of both ore and metal. In 1901 the importation of antimony ore was 1,731,956 lb., valued at $24,256, of which quantity 49,655 lb. valued at $1,536, were exported, leaving a net import of 1,682,301 lb., valued at $22,720. In 1902 the importation of antimony ore was 3,337,600 lb., valued at $67,750, of which 208,531 lb., valued at $4,602, were exported, leaving a net import of 3,129,069 lb., valued at $62,968.

The imports of antimony as regulus or metal in 1902 were 5,425,923 lb., valued at $336,311, of which 37,184 lb., valued at $2,710, were exported, the remaining net import for 1902 being 5,388,739 lb., valued at $333,601, as compared with 3,640,505 lb. of imported regulus or metal, valued at $254,529, in 1901.

The large increase in the quantities of antimony regulus and ore imported and exported during 1902 has been due to a peculiar condition of the freight rates from China, which, strangely enough, were about 10s. per ton from China to New York, and 30s. from China to England. The freight rate from New York to England being about 10s. per ton, shipments were made first to New York, whence the metal was trans-shipped to England, and thus pracmetal was trans-shipped to England.

The United States production for two years has been, in short tons:

	1901.	1902.	Changes.
From hard lead	2,235	2,904	I. 669
From domestic ores	50	....	D. 50
From foreign ores	353	657	I. 304
Total produced	2,638	3,561	I. 923
Metal imported	1,837	2,694	I. 857
Total	4,475	6,255	I. 1,780

In the table, the imported ore is estimated as above to contain an average of 52½ per cent antimony, and to yield 42 per cent of refined metal by smelting operations. Crude antimony, which is refined or concentrated ore and not metal, is included in the quantity of ore imported. Antimony regulus is taken as equivalent to the metal. The antimony contained in hard lead is calculated at 25 per cent, except for 1902, when an average of 27 per cent was taken.

* From the advance sheets of "Mineral Resources of the United States;" published by the United States Geological Survey.

NOTES AND DATA OF INTEREST TO ZINC MINERS.

BY W. GEO. WARING.

Valuation of Zinc Ores.—The value of any zinc ore depends (1) upon its percentage content of metallic zinc, (2) upon whether the residuum left after smelting for spelter or for zinc oxide can be profitably treated for gold, silver or copper, or as in the case of franklinite, for manganese; (3) upon its percentage content of deleterious elements which either deteriorate the product or increase the expense of reduction. Thus, lead and iron in considerable amount detract from the value of ore for the latter reason. Zinc-blende is deducted as an objectionable element in calamine ores, and calamines when found in blende ore are not paid for. Cadmium is deleterious for certain purposes, also antimony and arsenic. Sulphur, which composes about one-third of the weight of pure "jack" or zinc-blende, is not considered as an element of value, because the cost of converting it into sulphuric acid (a necessity at some works) leaves little, if any, profit.

The price paid to the ore producer per unit of metal (a unit here meaning 20 lb. or 1 per cent of 2,000 lb.), therefore, varies with the quality of the ore. Thus in Missouri, where the "assay basis" is $30 per ton for blende concentrates containing 60 per cent metallic zinc, concentrates containing only 20 per cent zinc are absolutely unmarketable; when they contain 40 per cent zinc with little or no iron they are worth 25c. per unit of metal, or $10 per ton; with 60 per cent zinc the unit price is 50c., and when they assay 64 per cent zinc the value per unit is 53⅓c., or $34 per ton.

It follows that the miner who fails to clean his zinc ore up to the economic limit, which for zinc-blende ore is held to mean that from 2 to 6 per cent of sand or earthy matter may remain in the concentrates, is throwing away value, when he sells the insufficiently cleaned material. For example, one ton f the 40 per cent ore above cited as worth but $10; if it can be cleaned to assay 60 per cent, even allowing a reasonable waste of 10 per cent in the operation, it will produce 1,200 lb. of 60 per cent ore, worth $18, a gain of $8. If cleaned to assay 64 per cent, the product would weigh 1,125 lb., and would be worth $19.12.

The only fair and equitable method yet discovered for ascertaining the value of any metallic ore is by assay. Buyer and seller are alike protected by this means, even against direct fraud, provided the usual precautions are taken. These precautions are: (1) That the sampling be thoroughly done as the ore is delivered, and in the presence of both buyer and seller or their responsible agents; (2) that an umpire sample be sealed at the time of sampling; (3) that the percentage of moisture in the ore as delivered be ascertained immediately after the weight is determined. The last proviso is necessary because the assay can only be made upon the dried sample, and therefore represents the percentage content of the ore minus its moisture. Obviously, in settling, it is immaterial whether the deduction for moisture be applied to the gross weight of the ore, or to the price to be paid per ton, or to the product of the weight by the price per ton, but it cannot be applied to reduce the assay value.

Weight and Volume of Zinc Concentrates.—The dry weight of a bin of ore or concentrates may be estimated very closely, if the space occupied by the ore be measured, and the weight of the ore per cubic foot is known.

The following data relative to the specific gravity and weight per cubic foot of zinc-blende concentrates and two or three other common constituents of Missouri and Kentucky zinc ores were obtained from careful tests made in the laboratory of Waring & Son, at Webb City, Mo., and are now for the first time made public.

The minerals tested were pure massive blende from Prosperity, Mo., containing 66 per cent zinc, with about 1 per cent of sulphides of cadmium, copper and iron, and having a specific gravity of 4.05; marcasite (cockscomb pyrite) from the same place; galena from Webb City, Mo.; clean flint from the same place, and average fluorspar from Livingston County, Ky. The samples were crushed to 5 millimeter size (1-5 inch) and finer, then assorted by sifting into 4 sizes, namely, 5 mm. to 2 mm. (1-5 in. to 1-12 in.); 2 mm. to 1 mm. (1-12 in. to 1-25 in.), 1 mm. to 0.25 mm. (1-25 in. to 1-100 in.), lastly, under 0.25 mm., or 0.01 in. The weight in pounds of a cubic foot of each sized material, closely packed and shaken down, was then ascertained, and lastly the weight of a cubic foot of equal parts of the various sizes, mixed, was determined. The specific gravity of each mineral was then ascertained, as given in column 6, below. Since the weight of a cubic foot of water is very nearly 62.5 lb., the weight of one cubic foot of each mineral in the solid state was found by multiplying the specific gravity by 62.5, giving the figures of column 7. The increase in volume brought about by crushing each mineral to the above fineness is shown in column 8, the figures of which are found by dividing those of column 7 by those of column 5.

	Mineral.	Sp. gr.	Lbs. per cu ft.	Composition.
1	Galenite (Galena)	7.4-7.6	460	86.58 p. c. lead. 13.42 p. c. sulphur.
2	Cerussite (lead carbonate, lead dry bone)	6.4-6.6	406	77.52 p. c. lead, 16.49 p. c. carbon dioxide, 5.99 p. c. oxygen.
3	Anglesite (lead sulphate, lead dry bone)	6.3-6.35	395	68.29 p. c. lead, 10.58 p. c. sulphur, 21.13 p. c. oxygen.
4	Arsenopyrite (mispickel, arsenical pyrites)	6.0-6.4	387	34.30 p. c. iron, 46.03 p. c. arsenic, 19.67 p. c. sulphur.
5	*Franklinite*	5.6-5.9	360	47.63 p. c. iron, 18.57 p. c. zinc, 15.62 p. c. manganese.
6	*Zincite* (red oxide of zinc)	5.6	350	80.34 p. c. zinc, 19.66 p. c. oxygen.
7	Pyrite (cube iron pyrites, cube mundic)	4.85-5.2	310	46.58 p. c. iron, 53.42 p. c. sulphur.
8	Greenockite	4.8-4.9	...	77.81 p. c. cadmium, 22.19 p. c. sulphur.
9	Marcasite (orthorhombic pyrite, radiated, capillary cockscomb, spear, liver and spongy or cellular pyrite)	4.6-4.8	310	46.58 p. c. iron, 53.42 p. c. sulphur.
10	Barite (heavy spar, barytes)	4.6	287	65.71 p. c. baryta, 34.47 sulphur trioxide, or, 58.85 p. c. barium, 13.73 p. c. sulphur and 27.41 p. c. oxygen.
11	Pyrrhotite (magnetic pyrite)	4.5-4.6	284	60.41 p. c. iron, 39.59 p. c. sulphur.
12	*Smithsonite* (calamine, zinc dry bone, zinc carbonate)	4.40	275	52.15 p. c. zinc, 30.09 p. c. carbon dioxide, 12.76 p. c. oxygen.
13	*Gahnite* (zinc spinel)	4.34	270	41.79 p. c. zinc, 17.32 p. c. aluminum, 20.49 p. c. oxygen.
14	Cnalcopyrite (copper pyrite)	4.1-4.3	262	34.64 p. c. copper, 30.44 p. c. iron, 34.92 p. c. sulphur.
15	*Sphalerite* (blende, zinc blende, jack, rosin zinc, etc.)	4.05	253	67.10 p. c. zinc, 32.90 p. c. sulphur.
16	*Willemite* (anhydrous silicate of zinc)	4.00	250	58.60 p. c. zinc, 27.00 p. c. silica, 14.40 p. c. oxygen.
17	Garnet (including polydelphite grossularite, almandite, pyrope, andradite, spessartite, bredbergite, ouvarite, etc.)	3.5-4.3	...	35 to 53 p. c. silica, 15 to 27 p. c. alumina, 25 to 40 p. c. iron, with lime, manganese, etc.
18	*Marmatite* (black jack, brown blende, etc.)	3.85-3.90	240	45 to 55 p. c. zinc, 10 to 18 p. c. iron and manganese, 33 to 36 p. c. sulphur.
19	Siderite (iron carbonate)	3.8	237	48.23 p. c. iron, 37.96 p. c. carbon dioxide, 13.81 p. c. oxygen.
20	Hydrozincite (zinc bloom, marionite, earthy calamine)	3.75	234	60.5 p. c. zinc, 13.6 p. c. carbon dioxide, 11.1 p. c. water, 14.8 p. c. oxygen.
21	Rhodonite (heavy pink spar)	3.4-3.9	228	41.85 p. c. manganese, 45.97 p. c. silica, 12.18 p. c. oxygen.
22	*Siliceous calamine* (ordinary zinc silicate)	3.45	216	54.22 p. c. zinc, 25.00 p. c. silica, 7.50 p. c. water, 13.28 p. c. oxygen.
23	Fluorite (fluorspar)	3.18	200	51.24 p. c. calcium, 48.75 p. c. fluorine.
24	Dolomite (bitter spar)	2.8-2.9	178	30.41 p. c. lime, 21.88 p. c. magnesia, 47.71 p. c. carbon dioxide.
25	Calcite (calc-spar, lime-spar, tiff)	2.72	170	56.04 p. c. lime, 43.96 p. c. carbon dioxide or, 40.06 p. c. calcium, 11.99 p. c. carbon, 47.95 p. c. oxygen.
26	Quartz (flint, etc.)	2.65	166	47.02 p. c. silicon, 52.98 p. c. oxygen.
27	Selenite (gypsum)	2.33	146	32.58 p. c. lime, 46.49 p. c. sulphur trioxide, 20.93 p. c. water.
29	Kaolin (china clay)	2.21-2.26	140	20.92 p. c. aluminum, 18.53 p. c. oxygen, 46.64 p. c. silica, 13.91 p. c. water.

Material.	1 Size 1-5" to 1-12" lbs.	2 Size 1-12" to 1-25" lbs.	3 Size 1-25" to 1-100" lbs.	4 Size finer than 1-100" lbs.	5 All sizes mixed. lbs.	6 Sp. gr.	7 Solid wt. per c. f. lbs.	8 Increase in vol.
Pure Galena	258.8	238.3	251.2	261.2	319.6	7.38	461	1.442
Marcasite (Mundic)	119.5	113.1	121.9	128.3	160.7	4.514	282	1.755
Pure Blende	139.4	130.0	128.3	136.3	170.7	4.05	253	1.482
Fluorspar	100.6	97.8	98.3	100.7	127.9	3.14	196	1.532
Clean Flint	77.9	75.4	71.0	75.1	91.2	2.57	161	1.765

The common statement that vein material occupies twice the space after breaking is, therefore, not quite true of rather finely comminuted minerals; and, as the above results show, the increase in volume varies according to the shape of the particles, since the flint and marcasite break into scales and elongated angular fragments, while the particles of the other minerals are nearly isometric. Pyrite and borite would no doubt give very different results from those obtained with marcasite.

Specific Gravity and Composition of Zinc Minerals, etc.—In the following list of zinc minerals, and other minerals usually associated with ores of zinc, the order followed is that of their specific gravities, beginning with the heaviest. The specific gravities given are compiled from standard authorities. The percentage compositions are, however, specially computed, using the International Atomic Weights for 1903, and refer to the theoretically pure minerals. It must be borne in mind that some of the minerals named are very rarely found in a state of perfect purity. Thus blende nearly always contains from 0.2 to 1 per cent of other sulphides than zinc sulphide, while marmatite, pyrrhotite and chalcopyrite are very variable in composition.

Assay Results as a Guide in Ore Dressing.—The assay of a sample of zinc ore concentrates, showing the percentage of each metallic element, as zinc, iron, lead, etc., gives the mine manager a means of eliciting defects in the mill work. If the character of the minerals composing the ore be known, the percentage of each mineral, of which one element is determined by assay, may be computed from the data of the last column in the preceding table.

Thus in a lot of concentrates consisting of blende, pyrite, galena and sand or earthy matter, the percentages of zinc, iron and lead being known by assay, the proportion of blende is found by multiplying the zinc by 100 and dividing by the percentage of zinc in blende (67.10), and similarly for pyrite and galena. The sum of the percentages so found, deducted from 100, shows about the proportion of sand or earthy matter in the material, a fact often very desirable to know.

Another method is to multiply the percentage of each element found by assay, by a factor obtained for each mineral by dividing its atomic weight into the atomic weight of the element.

The following incomplete list of such factors, also specially computed from the International Atomic Weights for 1903, will be found of use to mill managers as well as assayers:

Found.		Factor.		Sought.
Metallic zinc	×	1.49		= Zinc blende.
Metallic zinc	×	1.844		= Siliceous calamine.
Metallic zinc	×	1.9174		= Smithsonite (carbonate).
Metallic zinc	×	1.7064		= Willemite.
Metallic zinc	×	1.6526		= Hydrozincite.
Metallic zinc	×	1.2446		= Zincite (zinc oxide).
Metallic zinc	×	5.385		= Franklinite.
Metallic iron	×	2.144	(or $2^1/_7$)	= Pyrite.
Metallic lead	×	1.155		= Galena.
Metallic lead	×	1.464		= Anglesite.
Metallic lead	×	1.29		= Cerussite (lead carbonate).
Metallic copper	×	2.887		= Chalcopyrite.
Sulphur	×	3.04		= Zinc blende.
Sulphur	×	1.8718		= Pyrite.
Sulphur	×	7.4535		= Galena.
Lime	×	1.7856	(or $^{100}/_{56}$)	= Calcite.
Lime	×	1.3945		= Fluorite (fluorspar).
Lime	×	3.072		= Selenite (gypsum).

SHOT FIRES AND CARELESS MINING IN ILLINOIS COAL MINES.

As noted in a recent issue of this paper, a committee composed of two representatives of the United Mine Workers and C. Shuler and E. H. Coxe, representing the Illinois Coal Operators' Association, examined mines at Farmington and Edwards with a view to devise, if possible, some plan of avoiding accidents in shot firing to determine if shot-firers were necessary. The committee could not agree, the representatives of the United Mine Workers evidently being unwilling to subscribe to any statement reflecting upon the run-of-mine system of paying miners for their work, though, as is evident, this system puts a premium on careless mining.

The report of the representatives of the Illinois Coal Operators' Association states that the committee visited the mines in question, examined many of the working places and questioned many miners.

It found no conditions in any of the mines that, in the opinion of Messrs. Schuler and Coxe could cause an explosion if blasting were done properly and in accordance with the State law. No gas or dust was found in any of these mines, except some dust on the road in one entry in the Maplewood Mine which should have been sprinkled, and which the company promised to sprinkle. In all the mines were some badly placed and improperly prepared shots.

There has never been any explosion or accident in any of these mines, but there have been some windy shots, causing heavy vibrations of the air. These are believed to have been the result of improperly placed or prepared, or over-charged shots. Since shot-firers have been put on, contrary to the claims always made by the miners that the output of the mines would be increased thereby, the output has actually decreased.

Thus the Maplewood Coal Company, in their last three days without shot-firers, produced 13,462 lb. per miner per day, and in two days with shot-firers produced 12,722 lb. per miner per day. Howarth & Taylor, in their last six days without shot-firers, produced 5.4 tons per miner per day, and in six days with shot-firers 5.2 tons per miner per day. The decrease is attributed to men beginning to come out of the mines earlier, and to many not doing a full day's work. Some of the miners claimed that this falling off was due to the mines having been idle for three weeks, and the men not hardened to their work after so long a rest, but they would not guarantee the same production per man.

The reasons given by the miners for wanting shot-firers were that they were afraid of explosions and of windy shots, were afraid to be in the mines when so many shots were fired at one time, and they contended that with shot-firers there were fewer men exposed to danger. Some miners strongly opposed shot-firers, and some had no preference.

Messrs. Shuler and Coxe say, in reply, that there exist no natural causes which furnish any ground for fear of explosions, and there will be no danger from windy shots if shots are prepared and fired according to law. Further, less powder would be necessary and better results obtained if the rooms were cut, while this would require very little extra labor, considering the width of the rooms and the larger amount of coal obtained per shot.

The heavy vibrations of the air caused by many shots at once, can be avoided by having the miners in each entry, or pair of entries, light their shots in rotation.

As regards fewer men being in danger by using shot-firers, the careless miner is the only one to fear, and if he leaves his shot for some one else to fire he will be more careless and reckless, increasing the danger greater, so the question is whether to have a larger number of men subjected to a lesser danger or a lesser number of men, and the property, subjected to a greater danger. For these reasons the representatives of the operators believed that shot-firers were not necessary, but would increase rather than diminish the liability of explosions, and further contended that the demand for shot-firers was a gross violation of the State agreement, in which the miners agreed to shoot their coal and in which the operator was guaranteed the management of his mine and the direction of the working force.

In conclusion, Messrs. Shuler and Coxe summed up their findings and recommendations as follows:

"There are no dangerous conditions existing in the mines in question, and we believe that shot-firers are unnecessary and detrimental to the safety of life and property, and that they decrease the amount and hence increase the cost of production, and further, we believe the demand is in direct violation of the State agreement, and hence we recommend that they be discontinued and that the miners fire their own shots.

"Further, to insure greater safety to life and property we recommend that all shots be prepared and fired in accordance with the new State law; that the coal be cut in both rooms and entries, and in order to allay the fear of the men from so many shots at once, we recommend that the shots in each entry be fired in rotation.

"We realize that it is useless at this time to advocate the return to the lump-coal system of paying for mining, but nevertheless, we believe this is to be the surest cure for the reckless use of powder and the lack of proper preparation of shots, as this is the greatest incentive to induce the miner to produce a good grade of coal and hence prepare his shots better and use less powder, in other words, return to practical mining."

DIFFUSION OF CRUDE PETROLEUM THROUGH FULLER'S EARTH.*

By DAVID T. DAY.

At a recent meeting of the Geological Society of Washington, Dr. Day reviewed a series of experiments which he has been carrying on intermittently within the last five years on the changes which take place in crude oils by diffusion through various porous substances.

It was found that if crude petroleum were allowed to pass slowly through finely pulverized fuller's earth, it became separated by fractional diffusion into a series of oils differing in color and specific gravity from the original product, and representing the comparatively simple oils of which the complex crude petroleum is composed. In color the fractions varied from the dark brown or amber of the crude to the clear white of refined petroleum, and variations in specific gravity from 0.70 to 0.85 were secured.

An account was given of a series of experiments conducted by Prof. Engler, to determine the nature of the changes which took place in the oil. Prof. Engler's conclusion was that no chemical change whatever took place in the process of diffusion, the differences in the resulting products being entirely physical.

Experiments as to the effectiveness of various diffusion media tended to prove that the best results are invariably attained by the use of fuller's earth. Quartz sand and amorphous silica exhibit practically no selective action. Powdered limestone was equally ineffective. Different clays show greatly differing capacity for separating the petroleum oils, the greatest effectiveness being secured as the clay approaches fuller's earth in composition and texture.

Interesting practical and scientific suggestions made by Dr. Day as a result of his experiments were, first, that the great variety in color, specific gravity, viscosity, etc., of the different Pennsylvania oils may be due to differences in amount of diffusion suffered by these oils in passing upward through Carboniferous shales from a common source, rather than to differences in original composition; and a corollary of this suggestion is that these oils and those of the Trenton District in western Ohio may have an identical original source far down in the geologic column, the present differences being due to the greater diffusion suffered by the Pennsylvania oils in passing upward through the intervening strata to the horizons in which they are now found.

An examination of the Texas oils shows that they contain considerable amounts of constituents which are most easily removed by diffusion, the conclusion being, therefore, that they are nearer the original source than the Ohio and Pennsylvania oils.

* Abstract from *Science*, June 26, 1903.

IRON AND STEEL EXPORTS AND IMPORTS.

Exports of iron and steel—including machinery—from the United States in May are valued by the Bureau of Statistics of the Treasury Department at $8,330,063. This is $62,045 less than in May, 1902, a smaller decrease than in any preceding month this year. For the five months ending May 31 the total value of these exports was $39,603,346, against $41,529,401 in the corresponding period last year; a decrease of $1,926,055, or 4.6 per cent. The principal items of these exports are shown in the table below, in long tons:

	1902.	1903.	Changes.
Pig iron	34,661	5,804	D. 28,857
Billets and ingots	828	621	D. 207
Bars	15,315	17,004	I. 1,689
Sheets and plates	7,567	7,086	D. 481
Rails	41,158	2,927	D. 38,231
Structural steel	35,083	12,867	D. 22,216
Wire	42,927	45,022	I. 2,095
Nails	13,600	15,877	I. 2,277

The only increases shown were in lines where there is a long established trade. It must be remembered that in 1902 exports had fallen off very largely from those of the preceding year.

Exports of iron ore for the five months were 4,126 tons, against 13,908 tons last year, a decrease of 9,782 tons.

The total value of iron and steel imports in May was $3,679,821, against $3,263,261 in May, 1902. For the five months ending May 31 the total value of these imports was $20,716,641, against $11,535,233 in the corresponding period of 1902; an increase of $9,181,408, or 79.6 per cent. The chief items of these imports were, in long tons:

	1902.	1903.	Changes.
Pig iron	83,145	372,577	I. 289,432
Scrap iron and steel	23,186	44,703	I. 21,517
Ingots, billets and blooms	50,506	145,712	I. 95,206
Tin-plates	29,709	21,611	D. 8,098

The reason for the large increase in imports this year is found in the heavy consumption of iron and steel here. British and German pig iron and steel billets have found quite an extensive market along the Atlantic Coast. While the quantities taken are comparatively large, they are, however, insignificant when compared with our total production.

Imports of iron ore for the five months were 331,792 tons, against 485,115 tons in the corresponding period last year; a decrease of 153,323 tons, or 31.6 per cent. The greater part of this iron ore came from Cuba.

COAL IN SIAM.—It is stated that Col. K. A. Foss, who has been exploring on the frontier of Siam, has found outcrops of coal of very good quality. The outcrops are on the Tenasserim River, and some borings have shown one seam 23 ft. thick. A deposit of iron ore has also been discovered near-by.

A LEAD ORE WASHING PLANT.—At a recent meeting of the North of England Institute of Mining and Mechanical Engineers, Mr. W. H. Borlase read a description of the lead-ore washing plant at the Greenside Mines, in Yorkshire. The plant consisted of stone hoppers sloping gradually towards the front, at the bottom of which are fixed two grizzlies. The rough ore caught on the top of the first grating is hand picked for transfer to the stone-breaker. The stuff caught on the second grizzly is small enough for the roll-crusher, while the ore passing through is ready for treatment in the jigs. The fines and slimes are caught in settling tanks. About 70 per cent of the product is delivered to the ore-bins ready for the smelter. The total labor costs, including the hand-picking of the crude stuff on the grizzlies, which contains only about 7 per cent of lead ore, is about $2.50 per ton of ore. The washed ore delivered to the smelter carries about 80 per cent of metallic lead.

COMPRESSED AIR MOTORS FOR GATHERING CARS IN COAL MINES.*

By BEVERLEY S. RANDOLPH.

While coal-mining practice, in regard to hauling on main roads, has advanced very rapidly in recent years by means of compressed air, electricity and ropes, that of gathering from rooms or working-places has remained almost stationary. Few large mines are without some method of mechanical haulage on main roads, but the gathering from working places is still done almost entirely by means of animals or men.

An effort to improve this has been made recently by the Consolidation Coal Company, under the direction of the writer, at its mines in the Georges Creek Region. The seam worked is the Pittsburg Bed, known locally as the "Big Vein." It is from 8 to 12 ft. thick. Immediately overlying the coal there is from 5 to 6 ft. of "rashings," consisting of thin alternating beds of shale and coal, which disintegrate rapidly on exposure to the air, and make a very treacherous roof.

Rooms are driven 12 to 15 ft. wide, with a single track close to one side. A line of posts is placed just far enough from this side to leave a clear space for the mine car with a driver at the brake. This brings the post not far from the middle of the cross-bar, and provides more effectual support than if placed at the end. The tracks in these rooms are usually of 4 by 4-in. oak scantling, though of late years, owing to the advance in the price of lumber and the reduction in steel rails, more of the latter are being used. This track is laid by the miner. His pay for the work is included in the price per ton for mining. It is therefore, as a rule, unskillfully and often carelessly laid, and cannot be relied upon to carry safely any weight materially greater than the loaded mine car.

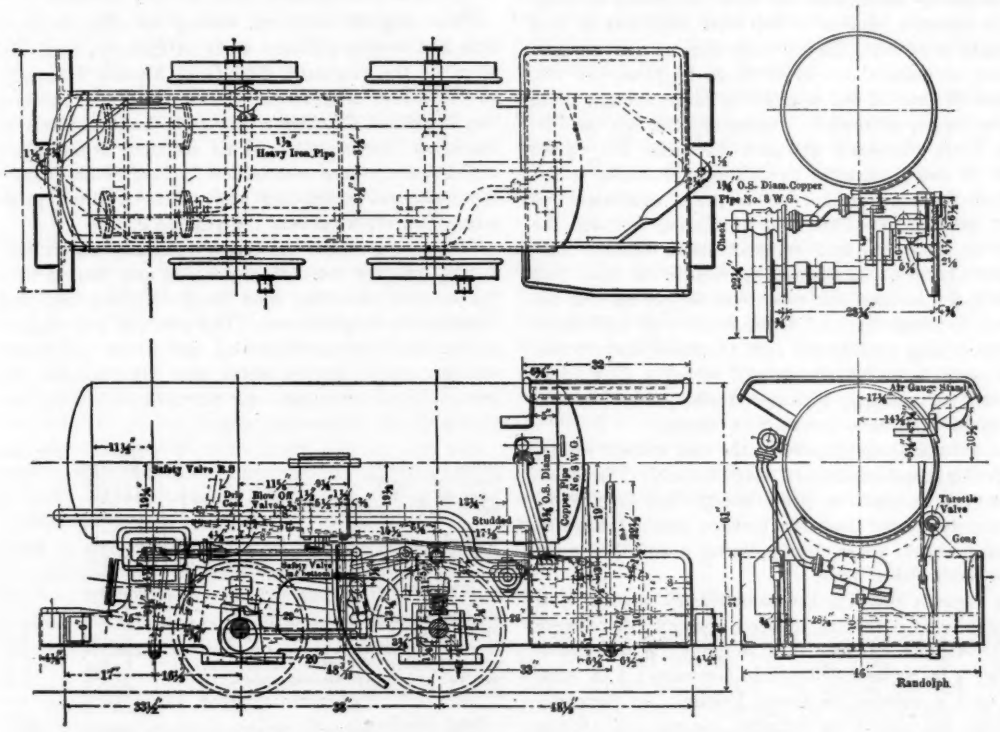
Compressed air was already in use on the main roads, driving motors weighing 30,000 lb. each, and which are used to haul the mine cars that have been assembled from the rooms, bringing them to the foot of a slope, from where they are hauled to daylight by means of a rope.

At the suggestion of the writer, the Baldwin Locomotive Works designed a motor, having the dimensions and general character shown in accompanying drawing, and guaranteed not to weigh more than 8,000 lb. when charged. Loaded mine cars frequently weigh 7,000 lb. gross, and their outside dimensions are then practically the same as the motor just mentioned.

Air is supplied to the motors by a Norwalk straight-line air compressor, 18 and 28-in. steam cylinders (compound), 18.5, 13.5 and 6.5-in. air cylinders (three-stage), all 30-in. stroke. This compressor also furnishes air for the two larger motors above mentioned.

Five of the small motors were placed in Ocean No. 2 Mine, at Hoffman, displacing a number of mules, but leaving 19 still working. The opportunity was taken to make a close comparison between the two methods of gathering cars.

Some of the mules working delivered cars directly to the haulage rope on the slope; others to the heavy air locomotives. All the small motors delivered to the locomotives. The mules are the best to be had, and weighed from 1,200 to 1,400 lb. each. The mine cars weighed 1,600 lb., and carried an average of 2.4 long tons. So far as grades were concerned, the mules had much the advantage, being employed on the routes with lighter grades.



SMALL COMPRESSED AIR LOCOMOTIVE FOR COAL MINES.

Each mule had a driver, at $1.98 a day; each motor had a driver at $2.67, and a brakeman at $2.03 a day.

Making all allowances for interest on cost of plant, and the like, the trial, which extended over a period of 18.75 days, showed that the cost of haulage by motor was 2.44c. per ton moved 1,000 ft.; while the cost of haulage by mules for the same unit was 4.15c. This shows a saving of 1.71c. by the motor.

In the matter of continuity of service, the motors show to great advantage. A broken-down motor can usually be repaired over-night, while an injured mule can only be replaced by a new one that must usually be broken in to the work before he is thoroughly efficient, entailing loss of time and output in each case.

In the actual placing of cars in the workings, the motor has little or no advantage over the mule. After the train is made up, its higher speed and larger load place the mule at a great disadvantage. The showing of the motors may, therefore, be expected to be better with long hauls than with short.

Owing to the fact that it is the practice in this mine to send the same motor or mule on different routes, depending on where miners may be loading coal, it is impracticable to present any discussion of this feature from the data at hand.

* Abstract of paper presented at Albany meeting of the American Institute of Mining Engineers, 1903.

PRACTICAL WORK AT THE ST. LOUIS EXPOSITION.

By H. A. WHEELER.

Dr. Holmes, the chief of the Mines and Metallurgy Building at the St. Louis World's Fair, is arranging for a series of mining and metallurgy displays in actual operation. On an outside space of about 30 acres that he has secured for this purpose, there will be a coal mine in full operation, working a coal-seam that occurs under the World's Fair buildings. This is the coal-seam from which the City of St. Louis formerly derived its local coal supply, but as the seam is thin, it has been exhausted, except in protected places like Forest Park, where the World's Fair will be held.

Prospecting will be very completely exhibited in actual operation with diamond drills and churn drills, while several big derricks will illustrate the drilling for oil and gas.

A Joplin mill will run on zinc ores shipped in from the Joplin District, and will illustrate the concentration system that has been evolved in that district. Another concentration mill will be built and run on the disseminated lead ores of Southeastern Missouri, following a different system. A stamp mill will be installed and operated on gold ores that will be shipped in from the Black Hills, and the sulphurets will be concentrated on tables.

An old Mexican arrastra will be operated on Western and Mexican ores to illustrate this historic process of extracting gold and silver.

The Missouri method of smelting lead ores on Scotch hearths and in air furnaces will be shown by native smelters, while a block of zinc furnaces will illustrate the conservative method of smelting zinc in retorts.

A very picturesque and interesting exhibit will be made from the wilds of Mexico, in smelting copper ores by the historic method of the Mexican Indians. The Indians will dress the copper ore in troughs, then smelt it in mud furnaces to a matte, roast their matte in adobe reverberatory furnaces, and then smelt the black copper in small smelting pits, receiving blast from cowhide bellows. The crude copper will be hammered out by hand into small pots and ornamental vessels, and sold on the ground to help defray the expenses of the exhibit. The Indians will live in their native, tile-covered huts, and grind their corn for the tortillas in stone mills brought from Mexico. This promises to be one of the most interesting and popular metallurgical processes ever exhibited, as the entire conditions will be reproduced, with entire truth to the wild surroundings of the out-of-the-way places where the Mexican Indians still follow the methods in use when Cortez first visited their country.

Several different systems of gas producers will be shown in operation, while a foundry will be in full operation making castings in iron and other metals.

Overhead tramways will convey ores to different parts of the grounds to illustrate the methods of transportation in the mountains.

Several other projects are under consideration to illustrate other mining and metallurgical processes in actual operation; as it is the design to have live or working exhibits, as far as possible, on account of the greater interest they excite, and their greater educational values.

THE LARGEST CAR.—The largest railroad car in existence has lately been completed by the Bethlehem Steel Company for its own use. The body of the car is formed by a pair of plate girders, like bridge girders. The trucks which carry it are each composed of a pair of plate girders, and they have 16 wheels each, so that the weight is carried on 32 wheels. The length between centers of the truck center-pins is 64 ft. The length of the body, or bridge trusses, is 66 ft. 10 ins.; their extreme depth is 6 ft. The car is 103 ft. 10.5 ins. in length over couplers; 10 ft. 2.25 ins. high and 9 ft. 9 ins. wide. It has a capacity of 300,000 lbs., and its actual weight is 196,420 lbs. When fully loaded the weight car-

ried would be about 15,500 lb. per wheel. The car was sent out on its first trip loaded with two castings for the 12,000-ton forging press built by the Bethlehem Steel Company for the Carnegie Steel Works. Each casting was 21 ft. 4 ins. long, 2 ft. 8 ins. wide, and 11 ft. 6 ins. high, and the total weight of the two is 277,000 lb. For the forging press referred to the Bethlehem Steel Company has also furnished a number of steel castings. One of these latter required about 325,000 lb. of metal, six 40-ton open-hearth furnaces being brought into requisition for the cast.

THE DEPARTMENT OF COMMERCE.

On July 1, 1903, the Bureau of Foreign Commerce of the Department of State, which has had charge of the publication and distribution of the *Consular Reports,* will be transferred to the Department of Commerce and Labor, in pursuance of provisions in the act of Congress approved February 14, 1903, creating that Department, and will be consolidated with the Bureau of Statistics, transferred from the Treasury to the new department. Reports from consular officers on commercial and industrial subjects will hereafter be transmitted through the Department of State to the Department of Commerce and Labor, and the latter will publish and distribute them.

A new bureau, to be known as the Bureau of Trade Relations, will, under authority of section 11 of the act of February 14, 1903, be organized in the Department of State on July 1, to formulate, for the instruction of consular officers, the requests of the Secretary of Commerce and Labor; to prepare from the reports of consular officers for transmission to the Secretary of Commerce and Labor such information as pertains to the work of the Department of Commerce and Labor; to transmit consular reports on special subjects, other than commercial, to various branches of the Government service; and to compile information for the use of the Department of State in the consideration of questions arising in the conduct of official relations with foreign governments.

Requests for consular reports should hereafter be made to the Department of Commerce and Labor.

BRITISH IRON AND STEEL TRADE.

The exports of iron and steel, and of machinery from Great Britain for the five months ending May 31 are valued by the Board of Trade returns as below:

	1902.	1903.	Changes.	
Iron and steel .	£11,023,643	£12,958,631	I.	£1,934,988
Machinery	7,480,915	7,660,478	I.	179,563
New ships	2,663,329	1,798,068	D.	865,261
Total	£21,167,887	£22,417,177	I.	£1,249,290

The heavy decrease in new ships brought down this year's totals. The chief gain was in raw iron and steel, and some forms of manufactured steel, as bars and rails.

The value of exports of mining machinery this year was £289,918, an increase of £62,196 over 1902. The chief item was £124,743 to South Africa.

Imports of iron and steel for the five months were valued at £3,352,431, against £3,248,386 in 1902; an increase of £104,045 this year.

Imports of iron ore were 2,699,081 tons, of which 2,166,598 tons were from Spain. The total shows an increase of 119,177 tons over the corresponding period last year.

SLAG CEMENT.

BY CHARLES C. SCHNATTERBECK.

Blast-furnace slag, which formerly was merely regarded as a waste product incidental to the manufacture of iron and steel, has become largely utilized in the preparation of cement. This cement has great tensile strength, is durable, and excepting for the fact that it sets slowly, might be employed for all the purposes which have created an enormous demand for Portland cement. It is satisfactory to add that the slag cement industry has become very profitable, in the United States, at least.

From an obscure position less than seven years ago, the manufacture of slag cement in this country has advanced so rapidly that it is to-day regarded as an important branch of the iron and steel industry. To emphasize this fact it need only be said that the United States Steel Corporation expended $70,843 last year for additions to the large cement plant of the Illinois Steel Company, at South Chicago, Ill. In 1902 this company produced 486,357 bbls. (86,849 long tons) of puzzuolana and Portland cement. There are five or six other manufacturers engaged in the industry, but the Illinois Steel Company furnishes by far the larger part of this country's supply. In 1897, when the industry was started here, there were three slag cement works that reported a production of 40,000 bbls. (7,143 long tons), which, compared with the 1902 capacity of only one company, shows what gratifying progress has been made in the past six years. With the growth of the industry manufacturers have succeeded in making a superior cement at less cost than was at first thought possible. To-day slag cement can be purchased at makers' works at $1.20 to $1.25 per bbl. of 400 lb., and if the contract is large enough these figures might be shaded. Some months ago the Illinois Steel Company accepted an order for 65,000 bbls. of slag cement to be delivered in sacks at the Duluth-Superior harbor at a price equivalent to $1.77 per barrel. This rate, of course, included the cost of the sacks and transportation, besides incidental charges. It should be mentioned also that Americans are not the only ones supplying the demand, for importers of German, British and other makes of slag cement are also extending their trade. Importers, however, are obliged to pay a duty of 20 per cent ad valorem, but, nevertheless, they can still sell at $1.65 or less, f.o.b. New York.

An advantageous feature of the slag cement industry is the simple method of manufacture. The treatment most in use is to granulate the hot slag by diverting its course from the furnace into a trough of running water; subsequently drying it and then mixing it with slaked lime.

As regards the slag cement industry abroad, it is interesting to note that at latest accounts there were 10 factories in France; 5 in Belgium; 2 in Luxembourg; 1 in Switzerland; 12 in Germany; 2 in Austria, and a number in Great Britain. In Germany 8 plants are producing between 145,000 and 150,000 tons annually, and in Austria, the output is not far from 110,000 tons.

ELECTRIC POWER TRANSMISSION IN NEW ZEALAND.—A plant is on foot in New Zealand for utilizing the power to be derived from the Huka Falls. It is estimated that these falls would yield 39,000 horse-power at the dry season. It is proposed to transmit the power to various points, including several mining districts, and to use a portion of it for working the New Zealand railroads.

ABSTRACTS OF OFFICIAL REPORTS.

Contennial Copper Mining Company, Michigan.

This company's report for 1902 shows receipts from copper sales, etc., of $102,579. The balance forward from 1901 was $153,278, making a total of $255,857. Expenditures on the mine were $160,947, leaving a balance of $94,910. The development work done during the year was 1,409 ft.

The report says: "As indicated in the accompanying report of the superintendent, we have confined our work mainly to sinking 'A' shaft on the Kearsarge lode, our purpose being to push it down to the 25th level—a distance of 2,600 ft. from the surface. The 18th level was also drifted north about 400 ft. We were delayed a number of weeks in the winter by the cave-in, which occurred about the middle of last December in the first level south of the shaft. There has been a steady improvement in the shaft during the year, and the 18th level is good almost its entire length. We are now also drifting on the 25th level, and have opened to date about 150 ft. north and south, exposing ground of unusual value.

"Since the last annual meeting the additional railroad facilities then anticipated have taken shape in the extension of the Copper Range Railroad during the past season from Houghton to Calumet, thus putting us in touch with all the points served by this and other railroads. With the very valuable asset of 10,000 shares of unissued stock still in the company's treasury; with a mile square of surface on which shafts could be sunk to a depth of 10,000 ft. on the dip of the Kearsarge lode—which has been demonstrated to be one of the master lodes of the country; with two railroads crossing the property, and with a complete, modern equipment already installed, the directors believe that Centennial will be able to produce copper as cheaply as any mine at Lake Superior."

Utah Consolidated Gold Mines, Limited.

This English company, having its office in London, and having a capital stock of £300,000, owns the stock of the Highland Boy Gold Mining Company, an American corporation which owns and operates the Highland Boy Mine, in Utah, better known as the Utah Consolidated. This complex organization has, however, been superseded by that of an American company, which has now taken over the property. The report covers the year 1902.

The report of the American company shows that during the year the company mined and treated 167,713 tons of ore; 691 tons being oxidized ore, and 167,022 tons sulphide ore. The product was 11,840,413 lb. fine copper, 160,916 oz. fine silver and 19,079 oz. fine gold. The earnings and expenses for the year, with the averages per ton of ore mined, are shown in the following table:

	Total.	Per ton.
Sales of copper	$1,667,552	$9.94
Sales of silver	117,786	0.70
Sales of gold	381,656	2.28
Rents and miscellaneous	1,581	0.01
Total	$2,168,575	$12.93
Less decrease in stocks of bullion..	176,526	1.05
Total earnings	$1,992,049	$11.88
Mining expenses	$242,621	$1.45
Development	42,249	0.25
Smelting expenses	497,346	2.97
Ore and matte purchases	83,891	0.50
General and miscellaneous exps.....	35,979	0.21
Freight, refining, etc.	239,963	1.43
Total expenses	$1,142,049	$6.81
Net earnings	$850,000	$5.07

The sales of product for the year—including metals sold from stocks on hand from previous year—were 19,083 oz. gold, 223,825 oz. silver and 14,004,114 lb. copper. The average price realized for silver was 52.62c. per ounce; for copper, 11.91c. per pound.

From the net balance of $850,000 shown, a dividend amounting to $534,000 was paid. There were written off property account as payments on original purchases $58,333, making a total charged against the year's profit of $592,333, and leaving a balance of $257,667. The balance brought forward from 1901 amounted to $649,469, making a total surplus at the close of the year of $907,136.

Developments at the mine during the year were satisfactory, and the estimated sulphide ore in sight at the close of the year was 1,050,000 tons, an increase of about 100,000 tons during the year. The mine and smelter plants have been kept in good repair, all returns and renewals being charged to operating expenses.

The report of the English company shows total receipts, derived from the American company, of £110,582. Payments for general expenses in London amounted to £5,581, and payments for dividends to £105,000, of which the sum of £22,633 was paid to shareholders in England, and £82,367 to shareholders in America.

The necessary steps have been taken for putting the English company into voluntary liquidation, and for transferring the entire property to the new company, organized in the United States. The shareholders of the old company will receive shares in the new corporation.

Mayflower Mining Company, Michigan.

This company's report for 1902 shows cash on hand, $117,806; interest, etc., $4,916; total, $122,723. Expenditures on the mine were $45,193, leaving a balance of $77,530. Work in the mine included a total of 871 ft. opening.

The directors' report says: "It will be remembered that at the time of the previous report there had recently been discovered an amygdaloid vein about 15 ft. wide, near the northern boundary of the property. As a test pit sunk on the lode showed it to be thickly impregnated with copper it had been decided to put down an exploratory shaft to determine whether the vein was persistent and to prove its value at greater depth. This work has been carried on as outlined, and although it cannot be asserted that the lode has been proved to have commercial value, the repeated disclosure of good stamp rock confirms the previous impression that this drifting should be carried on at this depth, both to the north and to the south, until we can arrive at a definite conclusion as to the character of this formation.

"The work with the diamond drill on the Old Colony property, lying just to the south of the Mayflower, was continued, so that the entire distance from the western boundary to the tunnel was practically covered. By the drill cores thus obtained, and by the information derived from previous exploratory work, there is now available a geological cross-section of practically the whole information from the eastern Sandstone to the western boundary. These cores indicate that at least five of the many amygdaloid lodes thus located are copper-bearing. Some of these are now being thoroughly examined on the adjacent property, and after the exploration above referred to has been completed it is our purpose to explore these same lodes also on our own property, with the view of determining whether they are sufficiently mineralized throughout to produce the metal in paying quantities. The work is being carried on at a small outlay, and with the buildings and machinery still in good repair and having practically all the equipment needed, the balance now in the treasury, at the present rate of expenditure, is sufficient for all work in hand or now planned."

Montana Mining Company.

This company's report covers the half-year ending December 31, 1902. The company still obtains some ore from its Drumlummon Mine, and is cyaniding the old tailings heaps at that mine. It is also working the Lucky Girl Group at Edgemont, Nevada, a recent acquisition.

The superintendent states the work done in Montana as follows:

	Mill.		Cyanide.	
	Amt.	Per ton.	Amt.	Per ton.
Tons worked	14,450	....	60,015	....
Bullion saved	$59,626	$4.13	$120,507	$2.01
Working exps.	$61,813	$4.28	$76,961	$1.28
Extra exps.	9,494	0.66	.....	....
Total	$71,307	$4.94	$76,961	$1.28
Net or deficit ..	D.$11,681	$0.81	N.$43,546	$0.73

In the mill at Marysville 40 stamps were used. The bullion sold from mill included 2,767 oz. gold and 8,223 oz. silver; from tailings, 5,080 oz. gold and 40,081 oz. silver; a total of 7,847 oz. gold and 48,304 oz. silver.

At the Lucky Girl Mine at Edgemont the development of the property consisted of 1,257 ft. tunneling, shafts and cross-cuts. The 20-stamp mill and cyanide plant treated 9,090 tons of ore. The bullion obtained realized $50,352, or $5.54 per ton. Working expenses were $39,233, or $4.32 per ton; prospecting, $9,660, or $1.08 per ton; total, $48,893, or $5.38 per ton; leaving a surplus of $1,459, or $0.16 per ton.

The superintendent's report says: "We have been endeavoring to find other suitable properties, and in the effort have continued our search over a large part of California, Arizona, Nevada, Idaho, Washington, Oregon and Montana, placing ourselves in direct communication with various parties in these States, who are sending us any information likely to enable us to acquire such an one as we require. We are now working in a small way on two groups of prospects, one in Montana and the other in Arizona, of which very little can be said at present. We are also holding in abeyance several properties in other favorable districts, which we can visit as soon as the snow goes. In compliance with the desire expressed at the last general meeting of shareholders, our efforts during the period under review have been carried on more extensively, and with greater vigor than at any time since we began this search."

The directors' report says: "The revenue account shows a net profit for the half-year of £6,300, which, with the previous balance of profit, amounting to £48,783, gives a total of £55,083. Deducting the ascertained loss of £1,645, arising from the failure of the Merchants' National Bank, there remains a net sum of £53,438 to be carried forward to the next half-year. The expenditure of £1,131 during the half-year, properly chargeable to capital account, but provided out of revenue earnings, relates exclusively to the properties in Nevada. . . .

"As a result of the decree of the Supreme Court of the United States, the case in dispute between the Montana Mining Company and the St. Louis Mining & Milling Company has been remitted to the Federal Court of Montana for re-trial.

"In pursuance of the policy enunciated in their report of March, 1901, which was indorsed by shareholders, the directors have maintained, and are maintaining, diligent serach for likely properties. Several have been bonded and thrown up on being proved to be of insufficient value. The Lucky Girl Group of mines in Nevada was purchased and equipped, mainly out of revenue earnings, and is now being developed as vigorously as possible, but time is needed to determine the full value. Options are held at the present time on two promising prospects situated in Arizona and Montana which are in course of development."

Allis-Chalmers Company.

The report of this well-known company covers the fiscal year ending April 30, 1903. The president's report shows that the profits for the year, after deducting all charges for depreciation, maintenance and repairs, amounted to $1,653,576. Dividends amounting to 7 per cent were paid on the preferred stock, leaving a balance of $516,076 to be carried to the surplus funds. This, added to the surplus at the beginning of the year, leaves a total of $820,836, as the net surplus at the close of the year.

The company's cash account shows the amount in bank at $1,628,009; in addition to which there were current realizable assets of $6,243,333, making a total of $7,871,342. The orders unfinished and on hand at the close of the year amounted to $8,797,483, an increase of $640,448 over the end of the preceding year. The outlook for work is excellent, and the business offered is in excess of the present facilities, although the completion of the new works will enable the company to take all that is offered.

The controller's report shows that the net outlay for the new plants and extensions during the year amounted to $2,791,898. This includes only actual increase of plants, all expenditures for maintenance and renewals having been included in the current expenses. The capital stock of the company amounts to $36,250,000, of which $16,250,000 is preferred and $20,000,000 common stock.

President Charles Allis' report says: "The demand for the products of this company has continued through the past year largely in excess of the capacity of the works, although the output has been greatly increased. The operations of the various works have, as last year, been greatly hampered and restricted on account of the many changes made in specializing the work and incident to the completion of the West Allis plant, where the largest and heaviest engine work is now being manufactured.

"The strike of the International Association of Machinists at the Chicago shops was settled about the middle of August last, and since then the company has been free from any serious difficulty, although it has taken some time to recover from the effect of the strike which was conducted at some of the plants for fourteen months.

"The new works at West Allis, near Milwaukee, Wis., are rapidly approaching completion, there now being employed at this plant nearly 1,200 men, which force will be increased to about 2,000 within the next few months. These works are acknowledged by experts to be as near perfect for economy and facilities of production as anything in the world, and when the present plans of the company are completed, there will be added from five to six million dollars annually to the volume of the business of the company.

The management has continued its policy of bringing all its plants to the highest efficiency, and has introduced the system of electric motors for all machines, thereby enabling the company to manufacture its product at all its works at a greatly decreased cost. Contracts have been let for the installation of automatic sprinklers and the most improved fire equipment at respective plants, thus effecting a large saving in the cost of insurance and reducing the danger of interruption to their continuous operation."

The directors' report says: "Three of the great units of the West Allis works, as designed by Edwin Reynolds when chief engineer (now consulting engineer) of this company, are now practically completed. Extensions of all other plants have also been made or are in progress. These additions of real estate, buildings and machinery to the productive property of the company have absorbed $3,069,897 of the cash capital originally provided for these purposes. All the property of the company is owned in fee, is free from mortgage or other lien, and is covered by insurance. No mortgage can be placed upon the property without the assent of 75 per cent of the amount of preferred stock outstanding.

"The reports of the president and comptroller show that the properties have been maintained, that liberal provisions have been made for depreciation, that quarterly dividends upon the preferred stock at the rate of 7 per cent per annum have been earned and paid, and that $516,076 remain of the net surplus earnings from the operations of the company for the fiscal year ending April 30, 1903, equivalent to more than 2½ per cent for that period upon the common stock. During the past year, as well as the previous year, the charges to capital have comprised only such expenditures as created additions to the plants for increased output, while, during the same two years, all the costs of repairs, renewals and replacements, for the maintenance and increase of efficiency and economic operation, for the better protection of the property and business from the risks of fire (as prescribed by the most exacting of the mutual fire associations), and the expenses of rearranging tools and equipment, have all been charged against the current revenues of the company.

"The development of the business of the company during the past year has been most satisfactory, particularly in various lines not hitherto given special attention, thus giving the company in the diversity of its products broader fields for its manufactures and greater stability for its industries. Its principal departments are now classified and its works specialized for the manufacture of steam, gas, blowing, pumping and hoisting engines, compressors and complete installations of electrical power stations, mining, metal reducing, sawmill, flour-mill, crushing, cement, water works and sugar machinery. The amount of unfilled orders on hand May 1 last was sufficient to keep all the present works in operation during the current year without considering the increased facilities that are in process of early completion. The increased volume of work on hand, the extent and variety of that offered, and the enlarged facilities for its production, constitute assurances of business that justify the stockholders, as well as the management, in expecting satisfactory results for the current year."

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

American Chamber of Commerce in Paris. Yearbook for 1903. Paris, France; published by the Chamber. Pages, 112.

The Iron Age Directory. Compiled by the *Iron Age.* New York; the David Williams Company. Pages, 280. Price, 25 cents.

Statistics of the Colony of New Zealand for the Year 1901. Prepared in the Registrar-General's Office. Wellington, N. Z.; Government Printer. Pages, 564.

United States Geological Survey. Pseudoceratites of the Cretaceous. By Alpheus Hyatt. Washington; Government Printing Office. Pages, 256; with 47 plates.

United States Geological Survey. The Carboniferous Ammonoids of America. By James Perrine Smith. Washington; Government Printing Office. Pages, 212; illustrated.

Moody's Manual of Corporation Securities. Fourth Annual Number, 1903. Edited by John Moody. New York; the Moody Publishing Company. Pages, 2348. Price, $7.50.

Register of Oil Wells, Los Angeles City, California. April, 1903. Compiled by Charles A. Blackmar. San Francisco, Cal.; issued by the State Mining Bureau. Pages, 14; with map.

Die Brikett-Industrie und die Brennmaterialen. By Dr. Friedrich Junemann. Vienna, Austria; A. Hartleben. Pages, 320; illustrated. Price (in New York), paper, $1.75; bound, $2.

Electrical Engineering. An Elementary Text-Book. By E. Rosenberg. Translated from the German by W. W. Haldane Gee and Carl Kinzbrunner. New York; John Wiley & Sons. Pages, 280; illustrated. Price, $1.50, net.

Report on Water Purification Investigation and on Plans Proposed for Sewerage and Water-works Systems of New Orleans. Prepared for the Sewerage and Water Board. New Orleans, La.; published for the Board. Pages, 266; illustrated.

Die Entwickelung des Niederrheinisch-Westfalischen Steinkohlen Bergbaues in der Zeveiten halfte des 19 *Jahrhunderts. III. Stollen, Schachte.* Prepared by a Committee of the Coal Mining Engineers. Berlin, Germany; Julius Springer. Pages, 580; illustrated.

United States Geological Survey Bulletins. No. 205. *The Mollusca of the Buda Limestone.* By George Burbank Shattuck. Pages, 96; illustrated. *No.* 206. *A Study of the Fauna of the Hamilton Formation in Central New York.* By H. F. Cleland. Pages, 112; illustrated. *No.* 207. *Action of Ammonium Chloride upon Silicates.* By F. W. Clarke and George Steiger. Pages, 56. *No.* 209. *Geology of Ascutney Mountain, Vermont.* By R. A. Daly. Pages, 124; illustrated. *No.* 210. *The Correlation of Geological Faunas.* By Henry Shaler Williams. Pages, 148. Washington; Government Printing Office.

BOOKS REVIEWED.

The Blue Goose. By Frank Lewis Nason. New York; McClure, Phillips & Co. Pages, 296. Price, $1.50.

We noticed recently that Mr. Nason, who is an expert mining engineer and a writer of much ability on mining topics, had made a venture in friction and had, in his first attempt, presented a very successful story of Western mining life. The "Blue Goose" is his second novel, and is quite as full of interest as the first—"To the End of the Trail." It is a vivid picture of life in a pioneer mining camp, and impresses one—especially one who has had some experience on his own account—with the truthfulness to life in the descriptions, and the excellence of the characters. There is plenty of incident in the book, and the reader who once takes it up will be sure to follow it to the conclusion—and to hope that Mr. Nason may find time to tell more stories.

Transvaal Chamber of Mines. Thirteenth Annual Report. 1902. Johannesburg, Transvaal; published for the Chamber of Mines. Pages, 500; illustrated.

A Descriptive and Statistical Statement of the Gold Mining Industry of the Witwatersrand. Annexure to the Thirteenth Report of the Transvaal Chamber of Mines. 1902. Johannesburg, Transvaal; published by the Chamber of Mines. Text, 44 pages; with 34 diagrams.

This report is a handsome volume of 500 pages, giving the details of gold production for the past year and includes various reports of the Gold Law Commission, the Witwatersrand Water Supply Commission, the Municipal Boundaries Commission and the Report of the Government Mining Engineer. The first half of the book contains an account of the annual meeting of the Chamber of Mines, the address of the president, Sir Percy Fitzpatrick, and the reports of various committees. It is a publication which does credit to the important organization, which so effectively represents the gold mining industry of the Transvaal. In a separate volume there is given the descriptive and statistical statement prepared by the committee of consulting engineers on the occasion of Mr. Chamberlain's recent visit to Johannesburg. This annexure contains a concise and authoritative account such as will always have great value as a record of conditions on the Rand gold-field. A series of diagrams and drawings—geological and engineering—render the information particularly complete and useful.

Supplement to the Directory of the Iron and Steel Works of the United States. Compiled by the American Iron & Steel Association; James M. Swank, General Manager. Philadelphia; the American Iron & Steel Association. Pages, 196. Price, $5.

The early editions of the *Directory to the Iron and Steel Works of the United States* were confined to descriptions of the country's blast furnaces, rolling mills, steel works, etc., which produce iron and steel. Gradually a demand was created for accurate and detailed information concerning the leading consumers of iron and steel, such as locomotive builders, car-builders, car-wheel makers, car-axle makers, pipe-makers, bridge-builders, tin-plate manufacturers, etc. This want was met in later editions of the *Directory* as promptly and fully as was possible. In preparing for the press the edition of the *Directory* for 1901, published early in 1902, it was found to be absolutely necessary that many of these lists of consumers must be omitted, owing partly to the increased space occupied by the blast-furnaces, rolling mills, and steel works, and partly to the urgent requests of iron and steel manufacturers everywhere to give them at the earliest possible moment full information concerning the consolidations that had recently taken place in the iron trade, including particularly the constituent companies of the United States Steel Corporation. So it happened that the *Directory* for 1901 did not contain as full lists of consumers of iron and steel as some of its immediate predecessors. This deficiency is now more than supplied. The volume of 196 pages which is now submitted to the American iron trade, embraces much more comprehensive lists of the consumers of iron and steel than we have heretofore compiled, as will be seen by reference to the table of contents on the following page. Its leading features may, however, be here recited.

The *Supplement* contains practically complete lists of the following leading consumers of iron and steel: Iron and steel bridgebuilding works, iron and steel shipbuilding plants, locomotive works, all kinds of carbuilding works, car-wheel works, car and locomotive axle works and steel locomotive tire works, chain works, cast-iron pipe works, wrought iron and wrought steel pipe and tube works, riveted pipe works, and seamless-drawn tube works; wire works, wire-nail works, cut-nail works, and horse-nail works; works for the manufacture of cold-rolled, cold-drawn, turned, polished and ground shafting; stamping and metal ceiling works, malleable iron works; bolt, nut and rivet works, and works for the production of all kinds of heavy and light forgings, including drop forgings. Some of these lists are entirely new, never having appeared in the *Directory.* There will be found in the *Supplement,* in appropriate connection with the classified lists above referred to, a full account of the organization of the following companies: American Steel Foundries, American Steel Casting Company, American Bridge Company, American Bridge Company, of New York; Empire Bridge Company, American Car and Foundry Company, Pressed Steel Car Company, Southern Car and Foundry Company, Railway Steel Spring Company, Standard Chain Company, American Locomotive Company, National Tube Company, Shelby Steel Tube Company, Central Foundry Company, United States Cast Iron Pipe & Foundry Company, American Shipbuilding Company, United States Shipbuilding Company, National Enameling & Stamping Company, American Steel & Wire Company, of New Jersey, and the National Steel & Wire Company. Some of these companies, with the properties operated by them, have been described in the last edition of the *Directory,* but their appearance in these pages is necessary that the reader may have before him a complete list of all the works in every branch of industry to which the *Supplement* is devoted, as well as information concerning the changes that have taken place in the properties, management, etc., of some of these companies.

Reverting to the statement already made, that the information now given in the *Supplement* would have been incorporated in the last edition of the *Directory* if time had permitted, we will add that the two books should be consulted as if they were really one book. Lists of some of the leading consumers of iron and steel, as, for instance, steel casting works and tin-plate works, will be found in the *Directory,* but not in the *Supplement.* It was not necessary to reprint them in the *Supplement.* The labor of preparing and printing these two volumes has been necessarily very great. All the information has been obtained directly from the manufacturers, and the reputation of the Association ensures its accuracy.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

THE ILLINOIS COAL MINE BLASTING LAW.—Below we give the terms of the Illinois law concerning the use of power in mines, which was passed at the last session of the legislature, and approved May 14, 1903, taking effect from that date:

"Section 1. Be it enacted, by the People of the State of Illinois, represented in the General Assembly.—That in all coal mines in this State, where coal is blasted, the quantity of powder used in the preparation of shots shall not in any case exceed 60 ins. in coal seams, 5½ ft. and over, and shall not exceed 48 ins. in coal seams under 5½ ft. in thickness.

"Section 2. For the purpose of determining the quantity of powder prescribed in Section 1 of this act, to be used in the preparation of any given shot, an inch of powder shall be one lineal inch, 1½ ins. in diameter, and it shall be measured in a metallic charger not to exceed 12 ins. in length and 1½ ins. in diameter.

"Section 3. No person shall drill or shoot what is known as a "dead" hole for any part of its depth; nor tamp any hole with drill dust or any other combustible material.

"Section 4. Any violation of any of the conditions or requirements of this act shall be deemed a misdemeanor, punishable by a fine of not less than $10, and not to exceed $100, or by imprisonment in the

county jail for a period not exceeding three months, or both, at the discretion of the court."

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

The Wohlwill Gold Refining Process.

Sir.—I beg to correct herewith a misstatement found in No. 26 of your JOURNAL, on page 975, under "Questions and Answers," regarding the Wohlwill gold refining process.

You state that the Philadelphia Mint has secured the American patent rights from the owner. This is not correct, as the United States Treasury Department has only secured the right to use the Wholwill process at the Mint in Philadelphia.

The owner of the patent is, however, at liberty and willing to grant other licenses in the United States, and I shall be glad to give more information on the subject to parties interested in the process upon application.

FRANZ MEYER.

No. 68 Broad Street, New York, June 27, 1903.

Foundry Pig Iron.

Sir.—I notice your "Metallic" on foundry pig iron in the JOURNAL for June 27. "All iron is good iron," if you can only find the proper place for it—that is the tenor of the note. It reminds one a little of the Kentuckian's ideas on whisky. But it is dangerous doctrine, especially for the average run of foundry foremen and managers.

It is true that in an all-round foundry doing all kinds of work for customers a place can be found for almost anything that will melt in the cupola. Some day an order is sure to come in that will use up all the old scrap, burned iron and odds-and-ends on the pile. The poor iron can be kept for such a chance. But in a well managed foundry, turning out engine and machine castings, let us say, there is no place for poor iron. Good castings are wanted, and must be made; and the best iron is none too good.

Therefore, your "Metallic" is too sweeping. If you had qualified it a ltitle, it might do; but it is dangerous as it stands.

FOUNDRYMAN.

Newark, N. J., June 30, 1903.

The Anti-Debris Question in California.

Sir.—Noticing an article in the editorial columns of the ENGINEERING AND MINING JOURNAL of June 13, I would be pleased if you would give space to the following in your valuable columns.

In order to begin to appreciate the debris question the climatic conditions that exist in California should be borne in mind. As every schoolboy knows, there are but two seasons in California, the wet and the dry, the former extending from November to April, the latter from April to November. Contrary to the usual belief, the wet season will not average rain one-third of the season and repeatedly, after one storm, the roads become dusty before there comes another rain; oftentimes no rain falls until after New Years, and, quite as often, rain does not fall after the middle of March. While the wet season is generally only one-third wet, there is no discount to the dry season, which is always three-thirds dry for at least seven months in the year.

As a result the wagon roads and trails of the State, with but small exceptions, become as dusty as is possible for roads to become and support any form of driving or teaming, the dust lying from 4 to 15 ins. deep, and more, especially in the mining sections of the State where communication between points is almost exclusively by wagon roads, over which pass heavy teams of 4 to 24 horses laden proportionately. These hammer and churn the country rock into an impalpable powder, and as there are countless numbers of quartz veins and bowlders, it naturally follows that the monster mill of thousands of steel-shod wagon wheels daily grind this quartz and country rock into the very best form for transportation by water.

For from seven to nine months does this process continue, not only in the mining sections but the agricultural as well, under a coludless sky and never a drop of moisture, and then—there comes the first good rain of the season, and as a natural result the dust of California roads is carried into her streams. The result is that hydraulicking is blamed for the silt and debris washed down and out of the highway of the horse.

All the hydraulicking done by human agency to obtain precious and non-precious minerals since the beginning of time has not deposited in the streams of the world, the amount of debris that is washed into the Sacramento and San Joaquin valleys in two ordinary wet seasons, from the roads of the mining and agricultural sections tributary thereto.

"There are none so blind as those who will not see," and it would appear to a disinterested observer that the Anti-Debris Association is composed of two classes, those that are in the matter for what there is to be made out of it, and zealous bigots who are Anti-Debris from force of habit, to be against any constituted order of things.

The Sacramento and San Joaquin valleys, where the Anti-Debrisite is most active, excepting the residents of large cities that belong to that organization, who are not affected one way or another, only for what is in it as a money making proposition—are two of the most fertile valleys on this earth—their extent may be known on the estimate that they will easily support a population of 80,000,000. Both valleys are nearly as level as a floor, and were formed by erosion from the higher levels of what is now the mining sections. Even the most rabid Anti-Debrisite must admit that the immense depth of soil was deposited prior to the beginning of hydraulicking in California.

The Sacramento and San Joaquin rivers, which carry the silt, occupy in their respective valleys a position analagous to that of the Mississippi River, of course on a reduced scale; like the Mississippi they are never clear except at the highest sources and after a rain not clear there.

The Mississippi forms mud-banks, shoals and new channels, and carries in suspension vast quantities of earthy matter; so likewise do the Sacramento and San Joaquin rivers. It was for this reason the United States was compelled to jetty the Mississippi; and yet no Anti-Debris Association ever claimed that placer mining had aught to do with the silt in that river. As a matter of fact hydraulicking in California has as little to do with shoaling the bay of San Francisco as the early-day placer mining in Montana had to do with the recent flood in the Mississippi Valley.

Of all unjust legislation, none was ever more unjust than that which resulted from Anti-Debris agitation. An industry that stood for progress and the betterment of the world, the Nation and the State has been throttled, families without number have tasted the bitterest dregs of dire destitution and the general wealth of the world is less, yet none have been benefited, for what can man do against the forces of nature assisted by thousands of miles of dust-laden roads? More than that, the general Government has been asked for appropriations, ostensibly to protect against hydraulicking, but which should have sailed under true colors. Improving the channel of the silt-bearing streams of California in order to allow certain persons to encroach on the natural channels of such streams.

All silt-bearing streams, large enough to be navigable, will require engineering works. For geological ages silt and debris has been carried by the Sacramento and San Joaquin rivers, and as long as the rocks of the Sierra Nevadas are in place to disentegrate, those rivers will carry and deposit debris.

J.

Stockton, Cal., June 20, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

White Quartz.—Will you tell me what pure white quartz is worth per ton?—L. & M.

Answer.—The price varies somewhat from time to time, but not materially. At present lump quartz sells at $2.50 to $4 per ton, New York delivery; the range of prices depending chiefly upon the quantity included in sales.

Silica.—I see you quote silica in your wholesale prices-current. Can you tell me who buys this material?—E. M. H.

Answer.—By silica we presume you mean glass sand, which is used extensively in the manufacture of glass and pottery, but owing to its low price—$2.75 per short ton, f.o.b. New York—will not stand distant transportation. Large consumers are the Trenton Potteries Company, Trenton, N. J., and the American Window Glass Company, Pittsburg, Pa.

Mineral Deposit.—Of what value is a deposit of mineral having the following analysis: Silica, 63 per cent; alumina, 19; sesquioxide of iron, 4.20; lime, 2.12; magnesia, 1.53; loss by ignition, 10.15 per cent?—H. H.

Answer.—You do not state the physical condition of your deposit; whether it is a rock, or in disintegrated form. Without further information the analysis is of no use in determining the uses to which it could be put. The probability is, however, that it has no special value.

Copper Sulphate.—In your issue of June 20 you say, under the head of Copper Sulphate: "Those who wish can buy at $4.37½@$4.62½ per 100 lb., f.o.b. New York."

What we wish to know is, on that quotation, what price a concern would have to pay for blue vitriol in 5 to 10-ton lots, and also in car-lots, f.o.b. New York?—A. B.

Answer.—The prices given in our market reports for copper sulphate are for large, or wholesale lots; this would include car-lots. The variation in the quotations noted is due to the fact that the market just now is unsettled, and there has been a good deal of competition among sellers. A large quantity of copper sulphate has been in the hands of jobbers, who have frequently, in order to make sales, named a lower price than is quoted by producers of the article. Of course, we have to take account of this condition in our report, and to give the jobbers' price, as well as the producers' quotation. This accounts for the range in quotatoins given. We may say that the outside stocks have now been largely unloaded. The dull season, however, is now on, and business is quite light. The domestic prices have been affected by decreased exports, and by some imports lately made. The market is, therefore, weak, as will be shown in our later reports.

Railroad Ties.—What were the results of the experiments made in England with glass railroad ties, as regards extent of experiment, cost and durability of the ties? What is the annual consumption of wooden ties by the railroads of the United States? The question may seem a little out of your line, particularly as to consumption, but the possible cheap manufacture of glass ties as a by-product in connection with a metallurgical process prompts the inquiry.—C. F. S.

Answer.—Experiments made in England with glass ties were on a very small scale, and apparently

were not seriously undertaken; that is, no effort was made to introduce them on any considerable scale. The results of such small experiments as were made were never stated, nor could any particulars be obtained. Apparently the ties did not serve the purpose. This seems quite possible from the fact that the railroad tie is generally believed to require some elasticity in order to be durable. A hard solid tie, like glass, would transmit the shocks to the supporting ballast or roadbed, but would very possibly be broken up itself in a short time. The steel ties used possess this quality to some extent, and, moreover, have sufficient strength to resist the shocks, while their thickness or bulk is so small that the effect is transmitted directly to the ballast.

A competent authority estimates that the railroads of the United States, in 1902, used 150,000,000 ties in new construction and renewals. This number of ties would be equal to 1,000,000,000 cu. ft. of round timber. We may add, that slag has been used for ballast with excellent results.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

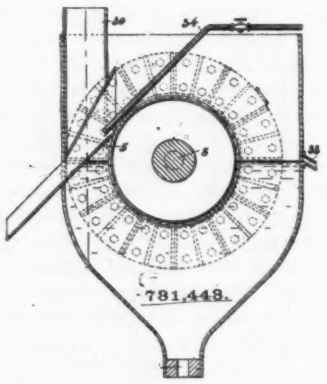
The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending June 23, 1903.

731,434. GAS-MANUFACTURING APPARATUS.—Grove Cothran, Summitville, Ind., assignor by direct and mesne assignments, to the Crude Oil Gas Company, Chicago, Ill. In gas apparatus a furnace, a coil for heating air under pressure and a retort within said furnace, a carbureter in communication with said heating-coils, an outlet-pipe, and a drain leading from said carbureter to a union-coupling, means within said union-coupling for forming an admixture of the contents of said drain and outlet-pipe, and means for spraying the same into said retort.

731,438. MACHINE FOR SEPARATING ORES, ETC.—Daniel S. Decker, New York, N. Y. The combination in a seprator with a supporting-frame and an oscillating platform arranged over said frame and constructed to carry separating devices, of pneumatic dash-pots and their pistons arranged to cushion the oscillations of the platform and the parts carried thereby.

731,443 and 731,446. MAGNETIC ORE-SEPARATOR.—Knut V. A. Eriksson, Falun, Sweden, assignor to Anders Eric Salwen, Grangesberg, Sweden. In a magnetic ore-separator the combination of, a separating-chamber formed by vertical plates, a transverse opening in said separating-



chamber, a rotatable shaft inserted through said opening, means for rotating said shaft, an electric winding on said shaft, means for feeding electric current to said winding, two disks rigidly fixed to said shaft, a number of magnet poles on each of said disks adapted to run close to the walls of said separating-chamber, a feeding-channel entering with its lower end between the said magnet-poles, and a discharge-channel for the magnetic material traversing the said feeding-channel.

731,450. METHOD OF TOUGHENING MANGANESE STEEL.—Robert A. Hatfield, Sheffield, England. A process of toughening manganese steel, which consists in slowly heating the steel to a temperature from about 750° to about 800° C., and then raising the temperature rapidly to from 940° to 1,125° C., and finally plunging the highly-heated steel in cold water.

731,452. AIR-VALVE FOR HOT-BLAST STOVES.—George K. Hamfeldt, Munhall, Pa. A hot-blast stove having connections arranged to create an air-pressure therein, said stove having in its side an inwardly-opening puppet air-valve formed of a plurality of parts, and hand-controlled mechanism arranged to force said parts inwardly one after the other against the air-pressure.

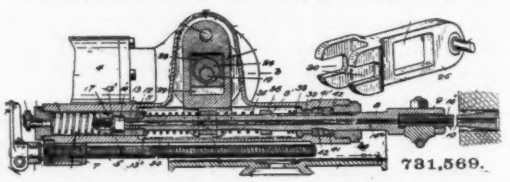
731,453. ELECTRODE.—James Hargraves, John W. Stubbs, and John Kearsley, Middlewich, England. An electrode consisting of a metallic conductor-bar having openings therein, rods of carbon passing thhrough the openings, castings of lead to make electric contact between the conductor-bar and rods a cement covering for the conductor-bar and lead castings, and blocks of carbon connected to the ends of the rods.

731,461. PROCESS OF PRODUCING FERTILIZERS.—Alfred K. Jarecki, Sandusky, Ohio. A process of producing a fertilizer consisting in the treatment of a basic phosphate with sulphuric acid, thoroughly mixing therewith a waste beet-sugar-alcohol slop containing nitrogen, and allowing the mixture to stand until the heat produced by the reactions drives off the excess of moisture, leaving a dry, granular product.

731,499. APPARATUS FOR INFLAMING ROCK-POWDER.—Johann Reinelt, Zawodzie, near Kattowitz, and Joseph Nowarra, Borsigwerk, Germany. The combination with a cartridge of a casing secured thereto, a firing-pin within said casing, a spring for actuating the same, a plate secured to said pin, pistons carried by said plate and adapted to be actuated by the explosion of the cartridge and means for retaining the firing-pin in its raised position.

731,522. APPARATUS FOR SIZING ORES OR FOR OTHER USES.—Seth R. Swain, El Paso, Tex. The combination of a tank having a partition in its upper part to form a sieve-compartment and a plunger-compartment communicating at their lower ends, a plurality of differently-sized sieves supported one above the other in the sieve-compartment which sieves are closed against entrance of water except through the openings thereof, vertically-reciprocating plungers in the plunger-compartment, means for feeding the material to be sized and water to the upper sieve, and an overflow-pipe located outside the tank and leading from the plunger-compartment below the normal water-level.

731,569. ROCK-DRILLING MACHINE.—John G. Heimrich, Seattle, Wash., assignor of one-half to John Heimrich, Seattle, Wash. In a rock-drilling machine, the combination with the frame having a cylindrical body portion, a ram reciprocally mounted in said body portion, a cross-head loosely mounted on said ram, spring connections be-



tween the cross-head and the ram, a lever pivotally connected adjacent to one end to said frame and provided with an elongated aperture intermediate of its length, sliding connection between the cross-head and the end of the said lever opposite its pivotal end, a shaft extending transversely through the frame, a motor secured to the frame, and the connection between the motor and the shaft; of a sleeve loosely mounted on said shaft and passing through the said aperture of the lever, an eccentric integral with the sleeve, and positioned within the said aperature, a box for said eccentric, and means to couple the said shaft to the said sleeve.

731,570. WATER-NOZZLE FOR IMPACT WATER-WHEELS.—G. J. Henry, Jr., San Francisco, Cal., assignor of one-half to Pelton Water Wheel Co., San Francisco, Cal. In combination with an impact-wheel, a water-nozzle provided with a series of outlet-openings, a nozzle-tip for each outlet-opening, plates secured to the nozzle on opposite sides of the nozzle-tips and projecting outwardly to a point beyond the discharge ends of said tips, inwardly-turned flanges at the free ends of the plates, and a cut-off slidable between said plates and between the flanges threeof and the discharge ends of the nozzle-tips.

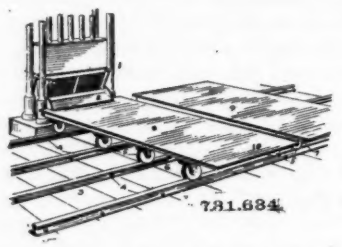
731,571. TESTING APPARATUS.—George J. Henry, Jr., San Francisco, Cal., assignor of one-half, to Pelton Water Wheel Company, San Francisco, Cal. In testing apparatus, a casing, a wheel in said casing, a plurality of water-wheel buckets carried by said wheel, means for rotating the wheel, a supply-nozzle projecting into the casing and arranged to discharge against the buckets, an outlet leading from the casing, and means whereby light-flashes are projected into the casing and onto the buckets as they receive the impact from the supply-nozzle.

731,590. PROCESS OF LEACHING ORES OR TAILINGS WITH SOLUTIONS OF ALKALINE CYANIDES.—Charles W. Merrill, Alameda, Cal. An improvement in treating ores or tailings containing reducing agents with solutions of alkali-metal cyanides which consists in oxidizing the reducing agents with an alkali-metal or alkaline-earth-metal hypochlorite.

731,608. PROCESS OF MANUFACTURING ARTIFICIAL STONE.—William Owen, Woking, England. A process for manufacturing artificial stone, comprising the mixing of from 40 to 50 mesh sand with 70 to 75 mesh lime in the dry state so that each grain of sand is coated with finer particles of lime, the said sand and lime being mixed in the proportions of 85 per cent sand and 15 per cent lime, then subjecting the product to enough vapor to properly slake the lime at a low pressure so as to not wash the coating from the sand and after the product is slaked and cooled subjecting the same to a high pressure to form it into a compact mass, drying said compact mass and admitting moisture to said mass until it is completely saturated and during this saturation admitting carbonic-acid-gas, then gradually reducing and finally stopping the admission of the moisture to the mass until the mass is in a hardened state.

731,631.—EXTRACTING GOLD OR SILVER FROM SLIMES.—Joseph T. Terry, Jr., Altar, Mexico, assignor of one-half to J. O. Treanor, Altar, Mexico. An improvement in working slimes and other unleachable material, consisting in spraying the sludge or solution into tanks partly filled with cyanide solution containing oxidizing or equivalent active chemical agent and made dense by the addition of an inert substance, allowing the mass to settle without agitation, then drawing off the clear liquor through vertically-disposed filters.

731,634. ORE-MILLING APPARATUS.—George R. Tuttle, Grass Valley, Cal. An apparatus comprising in combination with a stamp-mill, a series of tracks arranged trans-



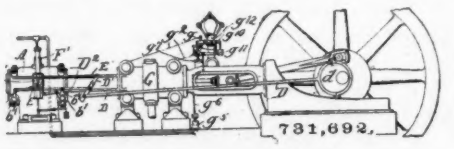
versely to the stamp-mill, a pair of independently-movable tables working thereon, and an amalgamating-plate carried by each table, said plates being alternately moved in front of the stamp-mill to receive the pulp therefrom

731,653. FIRE-BRICK.—John Ayling, Toronto Junction, Canada. A fire-brick made from hard-coal ashes, shale and fire-clay.

731,665. WELDING-MACHINE.—Charles H. Clayton, Freehold, N. J. The combination of a frame having side and end members, a slide mounted on said members, means for reciprocating said slide, a clamp provided on said slide and a similar, clamp provided on an end member ber of the frame, each of said clamps comprising a base-piece having at one end a shoulder and at the opposite end a curved portion, said shoulder and curved portion being integral with said base, and a clamping-screw passing through the curved portion and arranged at equal angles with the base and shoulder.

731,675. MACHINE FOR STRAIGHTENING T-BARS, ANGLE-BARS, ETC.—George H. Geyer, Pittsburg, Pa. A combination of a series of three or more rolls, each having bearing-faces at an angle to each other, said rolls being arranged to bear on different portions of the article in succession, and means for adjusting said rolls toward and from a common line.

731,692. AIR-COMPRESSOR.—George de Laval, Cambridge, and George P. Aborn, Boston, Mass., assignors to the Geo. F. Blake Manufacturing Company, New York, N. Y. In an air-compressor, the combination of inlet-valves each having a stem, a disk fixed on each stem and having a plurality of notches or projections, levers upon said stems provided with means for temporarily engaging the



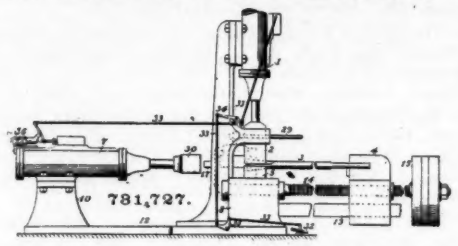
notches or projections and operated from the eccentric of the engine to move each disk in one direction, and a device operated from said eccentric and controlled by the varying pressure of the air compressed, and connected for positively and variably moving the disks in an opposite direction, in accordance with the variations of air-pressure to close said valves.

731,713. CONVEYER.—Mathias Schou, Wymore, Neb. In a conveyer the combination with a series of buckets, shafts and pulleys and endless chains thereon constituting exclusive means of supporting the buckets, of disalined trunnions and jaws upon opposite sides of each bucket, and corresponding relatively spaced special links in the chains, provided, respectively, with bearings for the trunnions and ears for the jaws upon the buckets.

731,728. APPARATUS FOR SHAPING AND SHARPENING ROCK-DRILLS.—William W. Word, Latrobe, Cal., assignor to Word Manufacturing Company. In drill-shaping apparatus, a horizontally-acting hammer with die head, intermediate spreading dollies for operating on the cutting end of the drill, a movable anvil at the opposite end of the drill for taking up the blows of the said hammer and die-head, and means for mechanically adjusting and locking the position of said anvil.

731,727. PROCESS OF FORGING ROCK-DRILLS.—William W. Word, Soulsbyville, Cal. A process of forging and shaping rock-drills which consists in first swaging the end of a drill-blank to bring it approximately to a flaring

cruciform shape having wings at right angles and angular depressions between, then swaging the terminal portion to condense and shorten the wing-corners, and finally forming the cutting edges of the wings by means of endwise blows delivered thereon through suitable appliances from

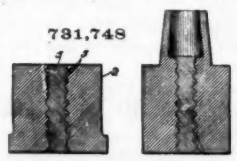


the center successively outward, which reduce and draw the redundant metal from the center outward, fill out the corners, and form finished V-shaped solid edges all lying in the same place.

731,732. METHOD OF MANUFACTURING THIN METAL SHEETS.—Thomas V. Allis, Bridgeport, Conn. A method of producing black-plate and similar metal sheets, which consists in coating metal plates with a material to prevent undue adhesion during their reduction, assembling them in a pack, folding the pack back upon itself to protect the coatings, heating said pack and reducing it while hot.

731,746. PROCESS OF MAKING SODIUM OXIDE.—Augustus Bischler, Basle, Switzerland, assignor to the Basle Chemical Works, Basle, Switzerland. A process for the manufacture of sodium oxide, by heating peroxide of sodium with sodium, the heating being effected *in vacuo* toward the end of the operation.

731,748. METHOD OF MAKING STAMP SHOES OR DIES.—Walter Brinton, High Bridge, N. J. A method of manufacturing stamp shoes or dies, which consists in



forming a body of unmachineable metal with an opening throughout having irregularly-shaped walls, heating the body, cooling the same, and filling said opening.

731,758. APPARATUS FOR MAKING SULPHURIC ANHYDRIDE.—Carl Daub, Antwerp, Belgium, assignor of one-half to Julius C. Deuther, Detroit, Mich. The combination of a column formed with an inlet-chamber at the top and an outlet-chamber at the bottom, a series of contact chambers and heating-chambers interposed between said inlet and outlet chambers, means for connecting the contact-chambers in series with each other, a heater having a riser connected thereto, branches connected to the heater and leading into the heating-chambers, an escape-pipe, with a series of horizontally-disposed pipes connected thereto, and leading into the heating-chambers on the sides opposite to the entrance of the said branches.

731,783. SELF-PROPELLING AUTOMATIC DUMPING-CAR.—Volney P. Keller, Merchantville, N. J. The combination in a self-propelling automatic dumping-car, of flanged car-wheels on car-axles, attached to a car-body in such a manner that the forward pair of wheels carry more than half the load, combined with a car-truck provided with incline tracks on which said flanged wheels move.

731,815. ORE-SEPARATOR.—Thomas J. Reid, Chicago, Ill. In an ore-separator, the combination of the main frame, with a draft-conduit mounted thereon, a hopper communicating with one end of said conduit, a movable sieve located in the hopper, a receiver communicating with the conduit, a movable sieve located in the receiver near the conduit, a valve located in the conduit near the upper end of the receiver and also near the said sieve so as to regulate the draft there-against, and means to force air through the conduit, to deflect the valve and to move said sieves.

731,839. SULPHURIC-ACID PROCESS OF EXTRACTING PRECIOUS METALS FROM SOLUTIONS.—Gustavus A. Bahn, Austin, Tex. A process of precipitating precious metals from solutions thereof, which consists in producing cyanide solutions of said precious metals, then acidulating with sulphuric acid, said cyanide solutions, then immersing zinc in sheet, plate, or other form, in the acidulated cyanide solution containing the precious metals.

731,860. MACHINE FOR MAKING BRICK OR THE LIKE.—Thomas Cole and William L. Cole, London, England. In a machine for making brick, a mold-receptacle having a stationary back, adjustable sides and a folding front, mechanism for locking the walls of said receptacle in closed position, and a press-head arranged to descend into said receptacle.

731,866. STONE-BREAKER.—Edwin Deane, New York, N. Y., assignor of one-half to James Cox, New York, N. Y. A crank-shaft, comprising a main part, a frusto-conical part disposed concentrically on the main part and jointed thereto at its small end, and a wrist-pin joined to the base of the frusto-conical part, said wrist-pin lying eccentrically to the main and frusto-conical parts.

731,908. COMBINED SUPPORTING AND ATTACHING DEVICE.—Charles Johnson, Butte, Mont. In connection wih a miner's cap, an adjustable band, a plurality of standards connected to said band, a plurality of attaching-arms adjustably connected at one end to said standards, a plate suitably connected to the other end of the said attaching-arms, and a clamping device.

731,910. BLOWPIPE.—Elmer Johnson, New Haven, Conn. A blowpipe comprising a valve-casing having ports through the same, air and gas pipes mounted in the ports, and a grooved spindle-valve adapted to move longitudinally in said casing and project beyond either and thereof, for the purpose of controlling the operation of said valve.

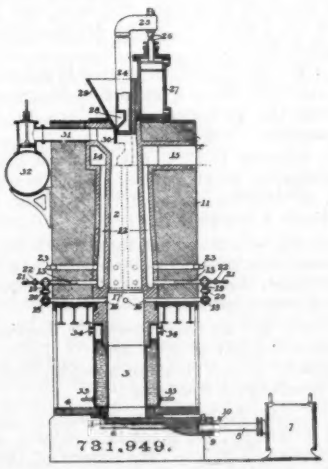
731,912 and 731,913. MECHANISM FOR DISCHARGING COKE-OVENS.—James E. Jones, Switchback, W. V. In a coke-puller the combination of an underworking scraper movable over the bottom of a coke-oven and provided with means for loosening the mass of coke under which it passes on the instroke from the caked mass of coke within the oven, and an overworking claw connected therewith and adapted to close over said scraped for grasping the loosened coke on the outstroke.

731,929. DIRECT-ACTING PUMPING-ENGINE.—Walter May, Reading, England, assignor to the Pulsometer Engineering Company, Limited, Reading, England. In a direct-acting pumping-engine, the combination with the engine cylinder and piston, and a moving part of the engine, of a main-valve chest, a piston-valve fitted to slide therein and control the passage of steam to and from each end of said cylinder, said main-valve chest having at a short distance from each end thereof a steam-admission port arranged to be closed by said piston when moving toward the corresponding end of the cylinder, a pilot-valve chest, a pilot-valve arranged to work in said last-mentioned chest and control the passage of steam to and from each end of said main-valve chamber through its corresponding admission-port, and means arranged to be positively operated from said moving part of the engine at each stroke of the pump and to move said pilot-valve in a direction to admit steam to one admission-port and place the other in communication with the exhaust and to afterward positively move the main valve in a direction and to a sufficient extent to uncover the admission-port to which steam has been admitted.

731,941. CONVEYER FOR ARTIFICIAL STONE.—Noyes F. Palmer, New York, N. Y. A conveyer for artificial stone provided with a hard bar, rotable rods depending therefrom, and transverse supporting-arms secured to the rods.

731,943. APPARATUS FOR CONTINUOUS FRACTIONAL DISTILLATION OF PETROLEUM.—William D. Perkins, Oil City, Pa., assignor of six-sevenths to George B. Aten, Frank M. Thompson, James H. Aten, Laura B. Wade, Thomas A. McIntosh and John M. Kerr, Wellsville, Ohio. In an apparatus for continuous fractional distillation of petroleum and similar hydrocarbons, the combination of the vaporizer and a receiver for the unvaporized product, of condensers connected with said vaporizer, pipe-coils or worms in the several condensers, which are connected in series, receivers for heavy unvaporized products connected with the several worms, a steam-superheater and a pipe connecting it with two condensers appliances for the latter and the vaporizer, and thermostatic regulators for such heaters.

731,949. METHOD OF MAKING COKE AND GAS.—John A. Potter, Philadelphia, Pa. A method of producing coke and gas, consisting in maintaining a vertical charge



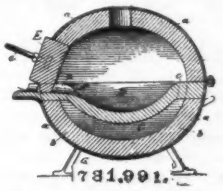
or burden, feeding coal to the upper portion of the burden, coking an intermediate part of the burden, and intermittently shearing off and discharging the entire lower portion of the coke column at the lower end of the charge.

731,950. COKE OVEN AND GAS-PRODUCER.—John A. Potter, Pittsburg, Pa. A coke and gas producer of stack form arranged to contain a vertical charge or burden, coal-feeding mechanism at the top thereof, mechanism at the bottom arranged to shear off and discharge a part of the charge, and a gas-offtake in its upper portion.

731,965. COALING-STATION OR STOREHOUSE FOR COAL, ETC.—Frederick Snare, Wolfgang G. Triest, and John A. McNicol, New York, N. Y. A plant for storing, and distributing coal, provided with a top floor, consitsing of an open framework, permitting the passage of coal to the floor below; tracks on said floor extending lengthwise of the building; cars adapted to run on said tracks; a second floor, divided into horizontal solid sections, forming the floors of partitioned storage-chambers, extending the length of the building, each of said chambers having a series of hopper-shaped openings, and doors, extending longitudinally of the building beneath the tracks of top floor, and a third, or basement floor, beneath the second floor, having a series of tracks in alinement with the hopper-like openings.

731,976. DREDGER.—Frederick W. Thunen and Louis L. Cheshire, Oroville, Cal. A cutting attachment comprising a disk having two inclined segmental projections formed thereon, the curved faces of said projections extending slightly beyond the periphery of the disk, and two additional projections extending inwardly from the periphery of the disk toward the center of the same, and cutting-teeth for said projections.

731,991. MELTING-FURNACE.—William J. Brown, Philadelphia, Pa., assignor of one-half to J. W. Paxon Company, Philadelphia, Pa. Thomas R. Brown, administrator of said William J. Brown, deceased. The combination in



a melting-furnace, of a casing, trunnions thereon, and a melting-pot having projections, said pot being supported in the casing wholly by said projections, one of the said supporting projections having in it a passage, so that when the furnace is tilted, molten metal can be poured from the pot.

732,020. STORAGE STRUCTURE.—Allan H. Woodward, Woodward, Ala. A storage structure comprising an elevated track, partition-walls below said track extending to the ground and dividing the space underneath the same into bins, discharge-chutes for said bins, a conduit having its bottom sufficiently below the ground-level to permit a car to travel under the chutes to receive material therefrom when it is discharged from the bins.

732,021. STORAGE STRUCTURE.—Allan H. Woodward, Woodward, Ala. A plant for feeding materials to a blast-furnace, having in combination a tunnel provided with chutes or passages extending to the surface of the ground, and having an opening in its bottom for the passage of materials, gates for closing said chutes, a skipway extending from the top of the furnace to a point below the opening through the bottom of the tunnel, cars movable along the tunnel and skipway, and means for shifting the cars along the tunnel and other cars on the skipway.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending June 6, 1903.

12,561 of 1902. AMALGAMATING PLATES.—H. J. Wright, Merioneth. Making amalgamating plates of stamp mills in sections easily removed and replaceable by others, in order to have to stop the mill for scraping.

12,834 of 1902. CONVERTER.—A. Reynolds, London. A combined converter and gas producer which supplies the fuel to heat the converter.

13,025 of 1902. ALUMINUM PRODUCTION.—W. Rubel, Berlin, Germany. Producing aluminum by heating alumina with phosphate of lime and sulphuric acid out of contact with the air.

13,744 of 1902. CASE-HARDENING IRON.—J. H. Knigge and J. P. van Olt, Ruhrort, Germany. Hardening the surface of iron by imbedding it in bone-dust mixed with yellow prussiate of potash, cyanide of potash and phosphorus.

14,018 of 1902. MINERS' LAMP.—W. Best, Morley. Improvements in safety lamps to allow the gauze to be removed without disturbing the glass.

14,420 of 1902. BLAST VALVE.—D. Boure, Workington. Improved equilibrium valves for the blast pipes of hot blast stoves.

15,041 of 1902. PYRITES DRYER.—Metallurgische Gesellschaft, Frankfort-on-Main, Germany. A drying chamber for drying pyrites before roasting, so as to produce a perfectly pure sulphurous acid unmixed with sulphuric acid.

4,237 of 1903. COKE CONVEYER.—M. Graham, Leeds. Improvements on the inventor's hot coke conveyors, for the purpose of catching the steam, fumes, and smoke on quenching.

7,290 of 1903. LOCK FOR MINERS' LAMPS.—C. Wolf, Zwickau, Germany. Improvements in magnetic locks for miners' safety lamps.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mr. Rupert E. Preston is at Yokohama, Japan.

Mr. Samuel Newhouse has arrived at Salt Lake City.

Mr. James I. Cowan, of Denver, has returned from Boston.

Mr. Walton E. Dowlen sailed by the *Philadelphia* on June 24.

Mr. Bernard MacDonald, of Spokane, is in New York City.

Mr. W. L. Miles, of St. Paul, is in Utah on professional work.

Mr. James E. Dunbar, of Boise, Idaho, is visiting at Brooklyn, N. Y.

Mr. Richard A. Parker, of Boston, was at Marquette, Mich., lately.

Mr. Herbert K. Scott has returned to London from Rio de Janeiro.

Mr. John B. Hastings, formerly of New York, has moved to Denver, Colo.

Mr. J. H. Curle, of London, arrived by the *Kronprinz Wilhelm* on June 30.

Mr. E. M. Rogers, of New York City, went to Milwaukee during the week.

Mr. John Hays Hammond is at Gloucester, Mass., recovering from a recent illness.

Mr. S. I. Marcum, of London, Eng., is examining mines in northern Sonora, Mex.

Mr. Edgar Collins, of Denver, is now investigating important mines at Parral, Mex.

Mr. Forbes Rickard is inspecting the Hays group of mines in Northern Sonora, Mex.

Mr. Ben. B. Lawrence has gone to Melrose, Nova Scotia. He will return about July 7.

Mr. J. I. Hoffman is now manager of the Farms Exploration Company in the Transvaal.

Mr. F. W. Moller, of Webster, Camp & Lane, Akron, O., is on a short trip to Europe.

Mr. T. R. Countryman, of Cripple Creek, Colo., has opened an office at Encampment, Wyo.

Mr. Philip Foster and Mr. J. H. Curle leave New York for the Tomboy Mines, Colo., on July 3.

Mr. Frank Klepetko and Mr. J. Parke Channing have gone on professional work to Parral, Mex.

Mr. L. T. Mattes, of Scranton, Pa., is examining properties in which he is interested at Ouray, Colo.

Mr. R. B. Taylor, formerly of South Riverside, Cal., has left for Antioquia, Colombia, South America.

Mr. Thomas McGuigan, superintendent of the American Boy Mine in the Slocan, has been at Spokane.

Mr. W. R. Feldtmann has been appointed manager of the Wassau (Gold Coast) Mining Company, West Africa.

Mr. P. Clark and Major B. C. Kingsbury have returned to Spokane from a trip to Siskiyou County, Cal.

Dr. Oscar Dyckerhoff, managing director of the Metallurgical Company, of Frankfort, is visiting this country.

Mr. W. G. Hildebrand has been appointed assistant manager of the Webster, Camp & Lane plant, at Akron, O.

Mr. A. L. Goodell, manager of the Montreal & Boston Copper Company, near Boundary Falls, B. C., is at Spokane.

Mr. Audley H. Ackermann has returned to London from Italy. He is now in the service of Bewick, Moreing & Co.

Mr. Fred W. Smith, of Breckenridge, Colo., has gone to Ketchum, Ida., to examine mining properties for Boston people.

Mr. Arthur Warren, of the Westinghouse Electric and Manufacturing Company, sails by the *Kaiser Wilhelm* on July 11.

Mr. A. A. Steel, of the Engineering Company of America, has left Chicago to make a geological examination in Idaho.

Mr. C. H. MacNutt, lately with the Huanchaca Mine, in Bolivia, passed through New York this week on his way to Denver.

Mr. F. W. McNair, president of the Michigan School of Mines, made an inspection of the Salt Lake, Utah, smelters on June 24.

Mr. Hudson H. Nicholson, of Denver, has returned from a professional trip through the mining camps of the Black Hills, S. Dak.

Prof. Alvin Phillips has removed his testing plant from Denver to Deadwood, S. Dak., and expects to remain in the last-named place.

Mr. F. H. Minard, who returned to Denver last week from southern Colorado, is now on a professional trip to Britsh Columbia.

Mr. David Gething, of Swansea, Wales, arrived in New York City on June 13 by the *Etruria*. He is investigating zinc smelting methods.

Mr. D. P. Bowers, superintendent of the Rustler Mining Company, operating the Snowshoe Mine, near Libby, Mont., has been at Spokane.

Mr. D. C. Jackling, manager of the United States Reduction and Refining Company at Canyon City, Colo., has been at Spokane inspecting local interests.

Mr. H. H. Campbell, general manager of the Pennsylvania Steel Company, sailed for Europe recently, and will be gone about three months.

Mr. Herman Keller, of the Engineering Company of America, New York, is making an examination of mining properties and smelters in Idaho.

President E. L. White, of the Bingham Consolidated Company, has concluded his investigations at that property, and is now in Montana.

Mr. S. J. Morris is manager of the American Kootenai Mining Company, operating near Libby, Mont., vice Mr. W. J. Beager, resigned.

Messrs. W. B. Mucklow, W. H. Alexander and W. H. Merriam, of the Majestic Copper Mining and Smelting Company, have arrived at Salt Lake.

Mr. Deane P. Mitchell, who represents Bewick, Moreing & Co., in New Zealand, sailed from New York for London by the *Campania* on June 27.

Mr. F. Sueltemeyer, manager of the Gewerkschaft Deutcher Kaiser, of Bruckhausen on the Rhine, is now visiting some of the leading steel plants in this country.

Mr. C. G. Schreiber has been appointed manager of the Model Gold Mining Company, at McCabe., Yavapai County, Ariz., vice Mr. L. W. Felt resigned.

Mr. John Williams, late consulting metallurgist for the Allesandro Copper Company, Silver City, N. Mex., is now with the Ladd Metals Company, at Portland, Ore.

Mr. George L. Reis has resigned as superintendent of the South Works of the Illinois Steel Company, and is now first vice-president of the Lackawanna Steel Company.

Mr. N. Tregear, formerly superintendent of the Le Roi Mine at Rossland, will take over the management of the Lenora mines on Mount Sicker, Vancouver Island, B. C.

Prof. W. B. Clark, of Johns Hopkins University, Baltimore, Md., State geologist of Maryland, has been examining the geological formations in Summit and Lake counties, Colo.

Prof. Charles Derleth has resigned his position in the engineering department at the Colorado State University, at Boulder, to accept a position at the California State University.

Mr. F. L. Ransome, of the United States Geological Survey, has gone to Colorado, to join Mr. Waldemar Lindgren in the geological examination of the Cripple Creek District.

Mr. W. E. Hendry, formerly superintendent of the Northern Light Mill, at Mercur, Utah, is now general manager of the Mexican mining properties, owned by the late August Sahlberg.

Mr. C. Swift, recently with the New Western Mining Company, at Plymouth, Colo., has gone to Ortiz, Sonora, Mex., to take charge of the mill of the Bonacita Mining Company.

Prof. L. T. Blake, of the State University, at Lawrence, Kan., was in Denver last week, visiting his experimental plant for the concentration of zinc ores by magnetic separation.

Mr. E. W. Sutphen, of Buenos Aires, Argentina, managing director of the Compania Metallurgica Argentina, is in New York City, with a view to purchasing a gold dredging plant.

Mr. Franz Burgess, general manager of the Schalker Gruben und Huetten Verein, of Gelsenkrichen, Germany, is at present in this country inspecting some of the large iron and steel plants.

Mr. F. Escher, retiring managing director of the Cia. Metalurgicia de Torreon, sailed for Europe with his family on June 30. Senor Ernesto Madero succeeds Mr. Escher as managing director.

Dr. George Ladd, director of the Missouri School of Mines, and Prof. A. L. McRae, accompanied by a number of students from the school, were at Butte, Mont., recently, visiting the mines and smelters.

Mr. Edward M. Johnson, for many years connected with the Colorado smelters and at present manager of the lead furnace department of the Cherokee Lanyon Spelter Company, of Gas City, Kan., was in Denver recently.

Mr. J. B. Treadwell, for years in the employ of the Southern Pacific Company, has purchased a steamer to go on a prospecting trip for oil along the southeastern Alaska coast. He will first try Kayak, where oil has already been found.

Mr. C. S. Herzig, of New York, who has since his return from Africa been making his headquarters in London, has accepted an engagement with Messrs. Bewick, Moreing & Co., of that city, as general manager of their Eastern Australian business, and sailed on June 19 by the *China* for Sydney, N. S. W.

Mr. Donald R. Morgan, formerly superintendent of La Mina Voladora y Anexas, is now general superintendent of Mines for the Cia. Metalulrgica de Torreon. In addition to the Veladora Mine, near Monterey, this company is operating mines at Terragas in the State of Chihuahua, and in the Parrot District.

INDUSTRIAL NOTES.

The new steel plant at Monterey, Mexico, has begun the manufacture of steel rails and structural steel.

The Cleveland Pneumatic Tool Company is making shipments of its specialties to England, France and Germany.

The Allis-Chalmers Company has removed its New York offices to the 14th floor of the Empire Building, 71 Broadway.

The Reading Iron Company has put in operation its new furnaces, at Reading, Pa. Work on the new pipe mill is being pushed.

The Glance Mining Company, of Bisbee, Ariz., is installing a Jeanesville compound condensing station pump, also a large sinker, in its mine.

The Crane Company, with New York offices at 490-502 Cherry Street, recently secured a contract for a shipment of its specialties to South Africa.

A Stillwell feedwater heater, made by the Stillwell-Bierce & Smith-Vaile Company, of Dayton, O., is being installed by the Penobscot Mining Company, of Deadwood, S. Dak.

The Compania de Altos Hornos Mexicanos, of Tepeyahualco, State of Puebla, Mex., is about to contract for equipment for the manufacture of steel rails and structural work.

The Weber Gas and Gasoline Engine Company, of Kansas City, Mo., has secured Mexican orders for some of its specialties, through Sommer, Herrman & Co., of Mexico City, Mex.

The Philadelphia Pneumatic Tool Company, with New York office at No. 149 Broadway, has recently taken orders for shipment to London, Paris, Brussels, Berlin, Copenhagen, Milan, Buenos Aires and Brisbane.

The Adamite Abrasive Company, of North Tonawanda, N. Y., has formed an auxiliary company to build a large plant to utilize the surplus raw product of the Adamite plant in making emery wheels. About 50 men will be employed.

The Dominion Iron and Steel Company completed 50 additional coke ovens recently. The company is operating three blast-furnaces and producing 615 tons of pig iron and 700 tons of steel billets daily. The April net earnings are reported at $36,000.

The Glacier Metal Company, of New York and London, has established a Southern office in Richmond, Va., in order to handle its increasing trade. The company states that "Glacier" is a high-grade Babbitt used for high speed and heavy running machinery.

The Asphalt Company of America was recently declared insolvent by Vice-Chancellor Stevenson in Jersey City, N. J. The decision restrained the company from continuing business in New Jersey, and also upheld the receivers appointed by the Federal Court.

The Mine and Smelter Supply Company, of Denver, Colo., has sold a complete mining plant, consisting of engine, boilers, pump, etc., to Thomas Riley, Pearl, Colo. The company also made sales recently of a set of 14 by 27 rolls, and four 5-ft. Huntington mills.

The Sullivan Machinery Company, of Chicago, Ill., with New York offices in the Empire Building, No. 71 Broadway, recently made a shipment of its mining machinery to the Mexican branch at Mexico City,

of the Mine and Smelter Supply Company, of Denver, Colo.

The John A. Roebling's Sons Company, manufacturers of iron, steel and copper wire rope and wire, Trenton, N. J., is considering the advisability of operating its plant only five days a week during the slack season. The annual capacity of the plant is 65,000 tons of iron, steel and copper wire, and 45,000 tons of wire rods.

Cadwaller R. Mulligan, who was formerly general manager, has secured control of the Dover Iron Company, of Dover, N. J., by purchase of other holdings. The plant will be enlarged. The new board of directors consists of C. R. Mulligan, John Mulligan, Chas. D. Fuller, Thomas W. Folsom and Ed. Van Volkenburgh.

The M. Garland Company, of Bay City, Mich., has just shipped to Miami, Fla., for the Offer-Cronkhite Company, a third rock cutter. These machines were built for quarry coral rock, of which a large hotel and the Court House at Miami are being constructed. They have proved a great success, although somewhat out of the regular line of the M. Garland Company.

The Denver branch of Fairbanks, Morse & Co. has sold recently a 7-drill compressor plant to the Calera Mining Company, Manaca, Mex.; a 4-drill compressor to the Shamrock Gold Mining Company, Silver City, N. Mex., a 50-ton leaching plant to the Standard Lixiviation Company, Las Vegas, N. M.; a 75-ton cyanide and magnetic separator plant to the Crown King Mining Company, Prescott, Ariz.

At the annual meeting of the Allis-Chalmers Company in Jersey City, N. J., June 18, the following directors were elected: Charles Allis, James H. Eckels, Philetus W. Gates, Max Pam and James Stillman. Later the following officers were elected: Charles Allis, president; William J. Chalmers, vice-president and treasurer; Henry W. Hoyt, second vice-president; Philetus W. Gates, third vice-president; Joseph W. Leaman, fourth vice-president and secretary; Joseph W. Watkins, assistant secretary.

The American Blower Company, of Detroit, Mich., has recently secured an order for three heating outfits to be installed in the new factory of the Packard Motor Car Company, of Detroit, and also has orders on its books for apparatus to be installed in the factory of Pettibone, Milliken & Co., Chicago; the Jas. Leffel Company, Springfield, O., and the Baltimore & Ohio round house at Keyser, W. Va. The company has recent orders for dry kilns from the Bengel Box Company, Louisville, Ky.; the Otter Creek (Gla.) Lumber Company, the Walsh Manufacturing Company, Frederic, Mich., and the Tuna Manufacturing Company, Bradford, Pa.

At a meeting of the directors of the Colorado Fuel and Iron Company on June 24 in New York City, Mr. Osgood retired as chairman of the board of directors and Directors Jerome and Cass also retired. J. H. McClement, representing Rockefeller-Gould interests was elected chairman of the board, and F. T. Gates, J. D. Rockefeller, Jr., and E. Parmlee Prentice were elected directors, and Messrs. Gates and Rockefeller were appointed to the executive committee. F. T. Gates is private secretary to Mr. Rockefeller, Sr., and Mr. Prentice is Mr. Rockefeller's son-in-law. These changes would indicate that Rockefeller is the paramount interest in the Colorado Fuel and Iron Company.

S. D. Sturgis & Bros., Los Angeles, Cal., have built a 4-cylinder gasoline truck. It is capable of developing 40 h.p. and having a pulling capacity of 10 tons. It has a range of speed from 1.5 to 6 miles and hour, and can climb a 16 per cent grade. Forty-two-inch wheels, with 12-in. rear and 7-in. front tires, are used. Gasoline is carried in the tank under the seat and beneath the batteries. One hundred gallons of water is carried under the platform and circulated by means of a pump through a coil of pipe under the front of the truck. Power is transmitted entirely by gears, operated by friction clutches. The length over all is 20 ft., the width 7.5 ft. The firm is prepared to build trucks of any size or capacity, and states it will soon have a standard design for general ore-hauling uses.

It has been decided to adopt water as the motive power for the electrical transmission plant, which the Dunedin Tramways Company, of New Zealand, is about to erect. The scheme includes the erection of a power house on the banks of the river, about 20 miles from the city, where 3-phase current will be generated by turbine driven alternators and transformed up to 13,000 volts for transmission. From a point near the city, the main transmission line will be divided and branch off to the various sub-stations which will be equipped with Westinghouse rotary converters, with storage batteries, and all necessary appliances. The designs for the whole scheme were carried out by Noyes Brothers, of Sidney, Australia, and the work of construction will also be under their control. All motors and other electrical machinery will be supplied by the British Westinghouse Electric and Manufacturing Company, Limited.

Hyde Brothers & Co., of Pittsburg, have designed and turned over to the Clearfield Steel and Iron Company a plant of modern design for the production of high-grade muck bar, chain iron, bolt and rivet iron, skelp and light iron and steel rails for lumber and mining purposes. The buildings, which are of steel throughout, cover a floor space of over 73,000 sq. ft., the main building being 34 ft. high and equipped with a 15-ton electric traveling crane for changing rolls, etc. Practically all the steam power required is derived from the waste heat from the puddling and heating furnaces, there being 9 waste heat boilers, agregating 1,200 h.p., attached to different furnaces. The Clearfield company has its own coal mines, within half a mile of the plant, and the works are on the banks of the Susquehanna River, on the line of the Buffalo, Rochester & Pittsburg Railway, about 2 miles from Clearfield, and have switching arrangement to the Pennsylvania Railroad and New York Central. The capacity of the plant, when running full, will be about 50,000 tons per annum of iron and steel combined. The capital stock is $750,000. The Pittsburg offices are in the German National Bank Building.

TRADE CATALOGUES.

Catalogue R, a 36-page pamphlet, published by the H. W. Johns-Manville Company, of New York City, describes the company's asbestos roofings. These are made in six different brands, of differing quality, and have been used on many mills, engine houses, machine shops, etc., including the plants of some of the largest manufacturing concerns in this country.

"Hitch Your Wagon to a Star," is the title of a pamphlet published by the Goheen Manufacturing Company, of Canton, O., which calls attention to the merits of Carbonizing Coating as a protective agent for iron and steel structures. The pamphlet states that the company uses chemically pure linseed oil, combined with stable pigments in this paint. Numerous illustrations show railway viaducts and depots, gas-tanks, pipe lines, office buildings on which this coating has been used.

The J. George Leyner Engineering Works Company, of Denver, Colo., has issued a new catalogue of 30 pages, describing the water Leyner rock drill. The company claims for this drill that it does not lose holes, easily crosses slips and seams, drills upper or back holes speedily, and can be operated in less space, takes less power and is lighter than other drills. The distinguishing feature of the drill is that the piston and tool are entirely disconnected, the tool being driven into, not plunged against the rock, while the cuttings are forced from the hole by compressed air and water under pressure discharged through the drill steel.

A 78-page pamphlet entitled the "Diamond Drill and Its Work," is published by the American Diamond Rock Drill Company, of New York City. The pamphlet takes up the uses of the diamond drill, gives a description of the company's drills with their special features, and describes notable diamond drill work in different parts of the world. The company's drills are made in various sizes from a hand-power drill, with a capacity of driving a hole with a 1-in. core to depths of 300 to 450 ft. to the large No. 15 drill, designed for a specially heavy work, having a capacity of 6,000 ft., beginning with a hole of 3 1-16 in. diameter, and finishing with a hole of 2 1-16 in. diameter. The company's drills are fitted with hydraulic feed, a hinged swivel head, and the spindles are mounted with roller thrust bearings to minimize friction of the rods in boring. The company states that its machines will use, either saw-tooth steel or steel-shot bits, where these can be used to advantage.

SPECIAL CORRESPONDENCE

San Francisco. June 24.

(From Our Special Correspondent.)

Four smelters are planned for different places in Southern California. Two for San Pedro, the seaport of Los Angeles, one for San Diego and one for Newport. All are to be at tidewater and none are within 150 or 200 miles of any mine. It is difficult to see how there will be business enough for all, though none is planned on a large scale. The Ivanpah Smelter at Manvel, San Bernardino County, and the Needles Smelter at Needles, in the same county, were idle all of last year, and they are much nearer the desert mines than smelters on the seacoast. As for Arizona and New Mexico the big smelter at El Paso, Texas, can handle ores cheaper than those on the coast. If promoters would concentrate their efforts and establish one good, big smelter it would seem more to the purpose. On the bay shores of San Francisco one big smelter does all the work for all of northern California, Nevada, etc. A small custom smelter is idle and another one is only doing a small business for a few mines.

The "jumping" of the Dead Horse or Consolidated Eureka Mine, at Carters, Tuolumne County, involves a conflict between State and Federal laws. The mine has been profitably worked for many years, but last August work stopped and the machinery was removed. The mine was never patented, but even under present conditions was not subject to location until January 1 of the coming year. While labor was performed, however, no proof of the labor was ever recorded as required by the California law of 1891. Of course, the mining company can readily prove that labor has been performed on the mine every year, and it is not probable that the courts will uphold the California requirement about labor when the Federal laws are silent.

The officials of the United States Land Office at Sacramento are taking testimony in cases involving the mineral character of lands about 30 miles from Auburn, Placer County, which have been entered as timber lands. A number of miners on the Forest Hill divide have testified to the mineral character of the land, and filed protests against the timber locators, though the latter contend that the records of the Land Office show that the Surveyor General has returned the land as non-mineral. There are mines all around this timber land, and mineral on the particular tracts, though as yet undeveloped. It may be stated that under the direction of the United States Bureau of Forestry an examination of the lands withdrawn from public sale in the northern and central parts of the State is under way to determine what proportion should be included within permanent forest reserves, and the extent of mineral lands and the demand upon the timber by mining.

The miners' strike at Randsburg, Kern County, continues. The owners of the Yellow Aster insist that they will not increase the miners' wages. The camp is fast losing its population, and is not being rebuilt. The miners at some of the mines near Mohave, in the same county, have also quit work. In response to the general demand of the miners' union for increase of wages the superintendent said: "The Yellow Aster Company has in the past employed, dismissed and made terms personal and individual as to compensation, and will continue to do so."

The Bay Counties Power Company has begun work on its large power plant at French Creek on the north fork of Feather River. The reservoir is to be 4 miles long and 100 ft. deep. A tunnel 6,600 ft. long will run from the reservoir to the power house, and in this the pipe will be laid, giving 1,700-ft. fall. About 30,000 h.p. is to be generated. Another plant for the same company is about completed on Butte Creek, 20 miles from Oroville, of 20,000 h.p. It will take about three years to complete the French Creek plant.

Spokane, Wash. June 26.

(From Our Special Correspondent.)

The June dividends of what is known as the "Spokane Group" of mines, amounts to about $165,000. The properties include the Standard, the Mammoth, the Hecla, the Milwaukee, the Empire State-Idaho and the Morning in the Coeur d'Alenes; the Kendall in Montana, and the Trinity County Gold Mining Company in Siskiyou County, Cal.

The celebrated sixteen-to-one case is on trial at Wallace, Idaho. It involves the Sixteen-to-One Claim north of Wallace, on which Finch & Campbell have a bond. The ground is in dispute over the validity of different locations. E. Galligan, the principal witness for the Bernier interests, who brings the suit, claimed that he had been approached by a man claiming to represent Finch & Campbell, who offered him $10,000 to get out of the country. To-day Galligan was arrested by an Iowa sheriff on a charge of horse stealing and breaking jail in Iowa 22 years ago. The plaintiffs are Annie Bernier, Horace M. Davenport, Walter A. Jones and Walter N. Morphy. The defendants are Ole Linn, Ole B. Olson and John S. Flink. The Finch & Campbell interests, which have a bond from the defendants, are really the defendants. The case was tried some time ago and a verdict was given the plaintiffs, but the Supreme Court granted the defence a new trial on the ground that liquor was supplied the jurors while they were deliberating.

The Highland Chief Mine in the Pine Creek District, near Warnder, Idaho, has ordered half of a 16-drill compressor.

Paul Watelet, who went to Canada to avoid arrest on a warrant secured by J. C. Carnahan, of Ohio, charging him with frauds in connection with the Colville Group Mining Company, with claims in Stevens County, Wash., has returned to Spokane, waiving extradition, and will stand trial here. Carnahan alleges that Watelet deliberately misrepresented the condition of the Colville group.

The St. Paul men who are working the Highland Chief group, near Wardner, Idaho, are reported satisfied with the showing. The ore is said to run about 12 per cent lead. They have a bond on it for $150,000, and have paid $7,500 on account.

A new phase of the Kennedy-Hanly case involving an eighth interest in the Skookum at Wardner, has been on trial recently at Wallace, Idaho. Hanley has a judgment of $180,000 against the Empire State-Idaho Company for ore taken from the Skookum without his consent. Now the Chemung Mining Company, controlled by Charles Sweeny and F. Lewis Clark, who are opposing Hanley in the Skookum case, has brought a suit to have a receiver appointed by the

courts, to handle the $180,000 due Handley when it shall be paid. The claim is made that Handley bought the eighth interest in the Skookum as trustee for the Chemung Company.

The United States Marble Company, operating the green marble quarries at Valley, north of Spokane, has booked a $12,000 order for 59 columns, ranging in length from 5 ft. 6 ins. to 10 ft. 9 ins., to be sent to Bristol, Eng.

Butte, Mont. June 25.

(From Our Special Correspondent.)

President Scallon, of the Anaconda Copper Mining Company recently issued invitations to the ranch people and others residing in the Deer Lodge Valley, and whose property has been so seriously affected from the fumes from the new Washoe Smelter, to attend a reception to be held at the smelter to-day, as a sort of celebration on the practical completion of the great flue and stack built to take care of the smelter fumes. A banquet in the inside of the stack at the base was one of the features. A special train brought guests from as far west as Garrison.

The height of the stack is 300 ft; inside diameter at top, 30 ft.; inside diameter at base, 33 1-3 ft.; thickness of brick shell at bottom, 4½ ft.; diameter at base outside, 44½ ft.; length of main flue, 2,170 ft.; width of main flue, 60 ft.; height of main flue, 36 ft.; height of tunnel under main flue, 7 ft.; width of tunnel under flue, 5½ ft.; length of main flue and connections, 5,500 ft. Three million bricks were used in its erection.

The Washoe Smelter will close June 30, in order to connect the various departments with the great flue. It will take several weeks to make the change. This will cause the closing of the mines of the Anaconda Company, at Butte, reducing the daily ore output of the company, which is 6,000 tons.

The two new engines ordered from the Nordberg Manufacturing Company, for use on two mines owned by W. A. Clark, the Original and the Stewart, are expected to be on the ground during July. They were contracted to be delivered in September last. The Butte Reduction Works is adding three Trent roller mills for regrinders, and two tables of the Michelson pattern are being installed in the concentrator. These tables are somewhat similar to the Wilfrey, but have besides the end motion an adjustable side motion. The Reduction Works is also placing in the furnace department a blister copper furnace. This will be the first of the kind in use in this camp.

Victoria, B. C. June 24.

(From Our Special Correspondent.)

Reports of the settlement of the coal miners' strike at Ladysmith are premature. There is a hitch in the negotiations.

Notwithstanding the fact that the output from the East Kootenay collieries last month was a record, amounting to 57,728 tons, the Kootenay smelters still complain of an inadequate fuel supply. At the Trail Smelter all the hand roasters were closed down last week on this account, and operations in the Boundary have been restricted. It is expected that the Crow's Nest Company's July output will reach 75,000 tons, but it is stated that the demands of the Canadian Pacific now consumes 15,000 tons monthly.

Mineral production for the half-year compares fairly well with the corresponding output last year. Rossland has produced approximately 180,000 tons already this year, as against a total of 330,000 in 1902; Boundary nearly 260,000 tons for the six months, or considerably over the average maintained last year. The only places where the situation has not improved are the silver-lead mines of East Kootenay and the Slocan.

The Kootenay press is discussing the changes imposed by local smelters for treating lead ores. One paper saying that the smelters have grabbed the bonus and pinned the lead producer down tighter than before. The principal lead mine operators do not appear to indorse these strictures, apparently believing that the present rates are fair, although in consequence of the depressed condition of the London lead market, the producer finds it difficult to meet the charges and make a profit. There are some, however, who point out that since 1901 the policy of the ore-purchasers has been to take full advantage of any rise in the market without making any correspondng concessions to the producer. Mr. Cavanaugh, manager of the Slocan Star, maintains that assuming as good a freight rate can be had via steamer from Vancouver, Seattle or San Francisco to London, as can be had via rail to New York, the miner should get the full London price of lead, less the "rates charged before the formation of the smelting trusts."

Mr. S. S. Fowler, general manager of the London & British Columbia Gold-fields, asserts that the present basis of settlement is more advantageous to the lead producer than that originally in force, and that Mr. Cavanaugh has assumed that smelting rates could be materially reduced "without giving the smelters and railways a smaller earning than they had some years ago, and that lead from ore bought in Canada was not used for domestic consumption in the United States, but smelted and refined in bond, and 90 per cent of the ore or bullion exported.

On the Coast renewed attention is being given the copper deposits at Howe Sound, and it is reported that the sale of a property adjoining the Britannia is pending. Mr. Kiddie, superintendent of the Tyee Smelter, says he has made arrangements to treat the accumulated Van Anda ores, and also the output from those mines at the Ladysmith works. Development at the Van Anda is proceeding satisfactorily, and there is now every likelihood of the bond being taken up at maturity by the British syndicate. At the Tyee Mine a second cage has been installed.

Fish Creek, a section of the Lardeau District, appears to be the only strictly free-milling locality in British Columbia. It includes a prospected area of 7 miles wide by 10 long. Several properties are beginning to be systematically worked. On one, the Gold Finch, from a small vein 150 lbs. of ore were taken last week, estimated to be worth $7,000. The discovery was probably a pocket, the returns of recent mill tests giving 2 oz. to the ton. But if the average value of the ore in the camp runs $12 a ton the district has a good future.

At Kamloops the Copper King Mine will ship to the Crofton Smelter. This mine is one of the few in this country owned by British companies well and economically managed. There are now over 1,000 tons of commercial ore on the dump, and considerable reserves have been blocked out.

The placer mining outlook is reasonably promising, though in the Quesnel section of Cariboo, a shortage of water from an abnormally dry winter is again feared. At Willow River, Slough Creek, Pheasant Valley and other sections there is much activity. In Atlin hydraulicking has begun on Birch and McKee creeks, and the winter dumps are reported yielding well.

In Boundary operations are still somewhat restricted by the seeming impossibility of securing adequate coke supplies for the smelters, and there is some talk of closing down the Boundary Falls Works. The British Columbia Copper Company is inviting tenders for hauling ore from the Morrison Mine to the Deadwood branch of the Columbia & Western Railway, about a mile and a quarter. If suitable arrangements are made for hauling a short spur for loading cars will be put in. If the sulphide content is satisfactory a proportion of Morrison ore may be treated at the smelter. Work is to be resumed on the Big Copper in July.

In the free-milling belt of the Nelson District, there is much activity. The following results have been received from the last run of the Wilcox Mill: During 18 days work, in which about 250 tons of ore were crushed, a gold brick weighing a little over 200 oz. was produced, and nearly a car-load of concentrates assaying about $45 per ton. A further car-load of concentrates is also on hand from the previous run. Development has begun on the Nome property, owned by the Atlin Gold Mining and Milling Company, at Ymir.

London. June 20.

(From Our Special Correspondent.)

The American mining companies under the control of Mr. Frank Gardner are causing him a great deal of anxiety and trouble at present. Last week I mentioned the case of the Avino Mines, of Mexico. This week the Copper King, Limited, has been prominently before the public. This company was formed in 1899 to acquire the mine of that name in Fresno County, California. A large amount of working capital was provided and a smelting plant has been built. Towards the end of last year it became necessary to provide further funds for development and for plant, and it was proposed to issue £125,000 debentures. With the exception of Mr. Gardner's subscription for £40,000 this issue has been a total failure, so that some other means of raising funds has had to be devised. In the meantime, the state of things in California has got into a hopeless tangle, owing to the legal difficulties with the resident manager, and over title to the smelting works property.

The Smelting Corporation, Limited, makes very little headway. It will be remembered that this company was originally formed to acquire the Fry process for treating zinc-lead sulphides, and that on the collapse of the process, it was taken over by a syndicate headed by Mr. John Peters, of London, for the purpose of turning it into a copper refinery. Mr. Peters and his friends proposed to transfer the smelting plant to Chile and to erect an electrolytic refining plant at the works at Ellesmere Port. The first part of the programme has been carried out, and for convenience the Chilean business has been transferred to a new company formed for the purpose, called the Pacific Smelting Company. The assets of the Corporation in Chile therefore appear in the balance sheet as investments in South America, and details of the progress made are not given specifically. It is understood, however, that it is not possible to obtain a sufficient supply of suitable ores in the district in which the smelters have been erected. In fact, the chairman of the Corporation, Mayor Ricarde Seaver, thought best to express his opinion on this subject in a practical way, by severing his connection with the company. Mr. Peters now proposes to use part of the funds of the Corporation to assist other local copper mines in increasing their output, a proposition which naturally raises much opposition. Another bone of contention among shareholders and directors is the proposal of the board to use the Von Gernet patent process for extracting copper. The process is an untried one and ought never to be taken up by a company that is floundering in the slough of financial and other troubles. Besides the main idea of the invention is similar to that of Mr. Neill, of Salt Lake, and it is doubtful if its validity can be relied on. It is poor policy therefore to subscribe some of the Corporation's funds for the purpose of working out the invention. This week the debenture holders of the Corporation were informed that it was inadvisable to pay the interest due to them, as the funds in hands were required for other purposes. The holders consented to the postponement, but I think I should have been in the minority who wanted their full interest, if I were so unfortunate to hold any of these debentures.

The Camp Bird Mine has been the victim of the rumor monger all this week. During the last few months exploratory work in the Chicago tunnel at some distance from the main ore reserves disclosed a rich shoot of ore and at the time a good deal was said about this discovery. It was, in fact, announced as the discovery of practically a new mine. During the past week it has been announced that the shoot has pinched out. This was the opportunity for the bear raider who, with his usual unblushing impudence, twisted the announcement to mean that the mine had become exhausted, and that the company was approaching collapse. The rumors scared many holders and buyers for a rise, and the quotations sank rapidly for a while. Presumably the people, who were thus frightened, never read the reports issued periodically by the company, or they would have been acquainted with the actual facts. The Chicago Tunnel is in an entirely different section from the main workings, and though it is disappointing to hear that this level has not continued in rich ore this conditon has nothng whatever to do with the part of the mine which has been opened up so extensively. In the main part of the mine there are over 2,000,000 tons of ore in sight, and developments continue to expose excellent ore, so there is absolutely no foundation for the wild statements of the bears. The directors of the company have never been very communicative, and in the present juncture have taken no steps to officially contradict the rumors. Directors often say that the whole of their time would be occupied if they contradicted all the adverse rumors that are afloat. No doubt there is some truth in this, but every now and then there are specially damaging onslaughts, that should be replied to speedily.

In connection with the Camp Bird, the following letter from Mr. J. H. Curle appears in the *Financial News* of yesterday:

"I have been expecting the directors of Camp Bird to issue a statement contradicting the rumors, now current, about the mine—rumors which I know to be without foundation. It seems to me the directors have made an error of judgment in keeping silent; but I do not wish to find fault, and shall, instead (with apologies for my presumption), tell you what I know about the position of the mine.

"I will begin by speaking of the control of the mine. The consulting engineer is Mr. Hays Hammond, whose reputation is very high indeed. I can conceive that Mr. Hammond would have cabled over an exhaustive statement at the present time, to reassure shareholders, but for the fact that he is seriously ill. The manager at the mine is Mr. W. J. Cox; he is a man for whose character and work I have high respect.

"I was at the Camp Bird in November of last year. At that date, having access to the assay and general plans, I worked out the ore reserves to be 236,000 tons, showing a net profit of £814,000, or £1 a share. Since then about 41,000 tons have been taken out; but the reserves are increasing, rather than diminishing, and there is ore broken in the stopes to the extent of 80,000 tons. The present mill has 60 stamps; but I see no reason why more should not be added right away.

These calculations refer only to the main workings, which lie at a considerable depth. That part of the mine lately opened by the Chicago Tunnel is a long way from those (and much nearer the surface); it may, in fact, be called a second mine. In this Chicago section a shoot of ore, 5 ft. thick, worth £10 a ton, was lately found. After continuing for 145 ft. it gave out. This is an ordinary mining occurrence; the reef will probably be picked up again before long. In any case, the Chicago section has already exposed a valuable ore shoot; it has greatly added to the possibilities of the property, and has in no sense harmfully affected the mine proper, the upper workings of which are 600 ft. below this.

It seems to me that the directors should ere this have made it quite clear to the shareholders that the pinching out of the reef in the Chicago level is not a circumstance which affects the general pros-

pects. By not doing so they have allowed an unwarrantably bad impression about the mine to go forth. I have no wish to apear censorious; but, really, we ought to make our gold mining industry as sound and as free from criticism as it deserves to be. It ought not to be possible for people to say—as one actually did in print—that the Camp Bird is another Stratton's. This is quite unfair; for the Camp Bird, in my opinion, is to-day one of the best gold mines in the world."

San Luis Potosi, Mex. June 23.

(*From Our Special Correspondent.*)

Owing to recent rains the Mexican National, south of Monterey, and the Mexican Central, north of Torrean, have been forced to abandon their trains, and business there has been almost at a standstill. Mining work, however, has not been seriously troubled.

In the State of Hidalgo, at Pachuca, the San Rafael, Real del Monte, Alta California, and La Purisima, report strikes at Pachuca, where some 400 years ago the Patio process of Bartolome de Medina had its beginning. At the Loreto Mill an improvement is being tested, consisting of adjustable plows or harrows for mixing the "torta," instead of mules. A movement is on foot for the building of a smelter for treating the higher grade ores. Senor Landero is figuring on enlarging his mill to handle the ores of the Guadalupana Mine at Ocayucan. In the adjoining State of Puebla, at Tepeyahualco, the Compania de Altos Hornos Mexicana, with a capital of $700,000, is building a 200-ton iron furnace.

I understand that the Valenciana Mine, at Guanajuato, has been taken over by the Guggenheim Exploration Company. These enterprising gentlemen have decided to postpone the flotation of the Dolores Mine, which is in Chihuahua, near the Sonora line. Mr. Hammond did not consider that the property warranted the proposed capitalization, and, on his advice, it has been decided to develop the Dolores for a year longer before asking investors to participate. At the same time I am informed that Mr. Hammond, acting with the Venture Corporation, has arranged to purchase the controlling interest in the Esperanza, the neighbor of the El Oro Mine, in Sonora. The price is said to be $2,275,000, gold; a 60 per cent interest has been acquired; this money is said to have been quickly subscribed in New York and London. The Esperanza has already had an interesting record, as it was the object of various negotiations on the part of the Exploration Company and the subject of an abortive flotation, which fell through by reason of the courageous attitude of Mr. Ross E. Browne, of San Francisco, who demurred, to what seemed to him, an over-capitalization of the mine. Since then it has been extensively developed, with excellent results, so that it is likely to add greatly to the reputation of Mexican mines.

In Guerrero a Colorado company is preparing to spend large sums for an iron smelter at the mouth of the Palsas River, for the ores near Zacatula, the copper properties at Marques, and the silver and gold mines at Teoro. The famous old Concepcion del Oro, with its silver, gold and mercury ores has been bought from the estate of Romero Rubio by Julius G. Tucker.

The two camps of El Oro and Tlalpujahua are really one district, though in the States of Mexico and Michoacan, respectively, and cover a working area of about 6 by 8 miles, wherein are claimed to be 14 different rich veins. The Bessie Mining Company, capitalized at $360,000, of which Pedro Requena, president of the Dos Estrellas Company is president, is preparing to sink a shaft 300 meters to catch the Dos Estrellas vein, and has placed orders in the United States for hoist, compressors and other machinery. The option on the Esperanza property is held by an American company, which expects to receive its reports on the property this week.

In the stock market there were no special deals. Monterey Iron and Steel brought $109; Cinco Senores, $188; Victoria y Anexas, El Oro, $275; Union, El Oro, $62; La Paz, Matehuala, $700; Norias de Bajan, Nuevo Leon ($20 par, dividend No. 65, $20 declared), $750; Soledad, Pachuca, $440; Sorpresa, $335; San Rafael, $1,200; Santa Gertrudes, $88; and La Blanca, $1,050.

Auckland, N Z. May 27.

(*From Our Special Correspondent.*)

Gold Dredging.—The winter frosts have lowered the level of the Molyneux River, and large returns are in order. The highest so far for this season is that of the Electric Company's No. 2 dredge, which for the week ending May 11 was 403 oz.

Thames-Hauraki Pumping Plant.—This very large and expensive plant, intended to enable the deep levels of the Thames gold-field to be developed, was sold at public auction a few days ago, H. A. Gordon, on behalf of the Government, being the purchaser. The price was £1,000 ($5,000), but the purchaser has to satisfy certain debts of the former owners. The plant, which consists of a double plunger and draw lift set, in a shaft 820 ft. deep, with geared pumping engine, winding engine, 10 large Lancashire boilers, etc., all practically new, cost about £100,000 ($500,000), towards which the Government paid a subsidy of £25,000. It remains to be seen what the Government will do. Probably the plant will be handed over to the Thames Drainage Board, whose old pump is nearly worn out with 30 years or more of service.

GENERAL MINING NEWS.

ALASKA.

(*From Our Special Correspondent.*)

A new placer discovery is reported on Lowe River, 23 miles from Valdez. There are said to be hundreds of acres of gravel from 3 to 30 ft. deep, and prospecting well. The hydraulic process will be needed, though some sluicing has been done with good results in shallow gravel. Some 800 acres of ground have been staked.

ARIZONA.

GRAHAM COUNTY.

(*From Our Special Correspondent.*)

Arizona Copper Company, Limited.—The late strike is considered as virtually settled, and the company is working its full quota of men.

Detroit.—The company is yet a little short-handed, but progress is satisfactory.

MOHAVE COUNTY.

(*From Our Special Correspondent.*)

Minnesota.—Since work stopped at the mine and mill in Chloride news has arrived that E. T. Loy, of Los Angeles, and W. J. Cleveland, of Philadelphia, may at any time resume work. The latter is the president of the Philadelphia & Arizona Mining Company, owning the property, and the former is general manager.

Tennessee.—The rich ore-body on the 600-ft. level of this mine at Chloride is proving larger than was anticipated. In many places assays give from 60 to 80 oz. to the ton.

CALIFORNIA.

BUTTE COUNTY.

Lava Beds Dredging Company.—This company, Karl Krug superintendent, has bought for dredging purposes the 20-acre olive orchard of the Kusel Brothers, situated at the lava beds near Oroville. The orchard was planted in 1888, and is in full bearing, but will be destroyed in the dredging operations. The price is stated to have been $50,000.

There are 22 dredgers working in the valley of the Feather River adjacent to Oroville.

CALAVERAS COUNTY.

Gaston Hill.—From this old mine, near El Dorado, under bond to Lewis Catchings, rich rock is being taken out at a depth of 105 ft. The old works are being cleaned out and retimbered.

Martha.—Some fine specimen quartz is being obtained from this mine, near El Dorado, owned by J. P. Snider and C. B. Coulter.

Mountain King.—At this mine, near Hodson, owned by the Womble Brothers, a hoist is being put up and a 20-stamp mill will soon be installed.

Royal.—J. H. Brotherton has sued for an interest in this mine, at Hodson, on the ground that he and J. C. Kemp van Ee, the owner, were partners at the time Van Ee secured the bond on the Hodson. Mr. Van Ee contends that while he was associated in several mining ventures with Mr. Brotherton, while in London, that he was acting independently when he secured the Royal, now a paying property, and developed by himself.

Stockton Hill.—The Chicago and Pennsylvania people who recently purchased these placers—the Stockton Hill, Clover Leaf and Hexter—near Mokelumne Hill, expect to spend about $75,000 in development and equipment. On the Stockton Hill boilers, engine pumps and a small mill are being installed, and machinery is soon to be provided for the other claims. K. H. Siebel, of Chicago, and Harvey Yeager, of Forty-Fort, Pa., are the principal owners.

HUMBOLDT COUNTY.

Humboldt Placer Mining Company.—At the annual meeting held at Eureka the following officers and directors were elected: E. W. Dyke, president; W. P. White, vice-president; W. S. Curless, treasurer; W. J. Ashill, secretary; J. W. Wood, D. M. Jackson, B. Arthur and R. F. Durnford.

INYO COUNTY.

In the Lower Tonopah mines, at Lone Pine, two cross-cuts are being run to demonstrate the width of the main vein. If the development work proves satisfactory Judge G. W. Cottrell, one of the owners, states that adequate milling facilities will be provided at once.

The ledges of copper in the northern portion of the county and those along the southern end and the Funeral range are to be examined by Frank Westinghouse for Los Angeles and Arizona men, with a view to development.

KERN COUNTY.

The miners' strike, at Randsburg, has not yet been settled, and many people are daily leaving the camp. The Napoleon Consolidated has shut down and discharged its men, and the Yellow Aster and other prominent mines continue idle. The manager of the Yellow Aster states that the mine will not be reopened until the men return to work on the old rate of wages. The mills are being cleaned up and the shafts will be covered and the tunnels bulkheaded.

Keyes.—In this mine, at Isabella, good rock has been found below the former workings at 350 ft. depth.

Two lime kilns are to be built by J. W. Jameson on his lime deposit, near Tehachapi, where several other lime deposits are being worked.

Several oil prospecting rigs are operating on the Carissa side of the coast range, some miles west of McKittrick.

Fulton Oil Company.—This company, at Sunset, Mr. Thorn superintendent, has succeeded in landing the casing in well No. 2, going through 92 ft. of oil sand to a clay foundation.

Tekla Mining Company.—Los Angeles men are considering the proposition of erecting a mill, near Caliente, on the property of this company, to treat the ores from mines in Amalie District.

MARIPOSA COUNTY.

Exchequer Mining Company.—This company, with Miles O'Brien superintendent, has bought the five claims owned by M. and R. O'Brien and Charles Marriner, on the Merced River, 6 miles from Hornitos. They are all tunnel propositions, and twelve men have been set at work.

NEVADA COUNTY.

Buckeye.—This mine, in Willow Valley District, near Nevada City, T. B. Gray superintendent, is to have a new 10-stamp mill. The tunnel on the property is in 700 ft., and about 700 tons of ore are on the dump ready for milling.

Murchie.—At this mine, at Nevada City, J. C. Campbell superintendent, some good rock is being sacked for shipment to the smelter. Two new concentrators have been bought by Mr. A. Maltman for the Texas mill, where the Murchie ore is to be treated.

Oustomah.—The new 10-stamp mill and concentrator on this property, at Nevada City, Frank S. Morgan superintendent, has been started after years of idleness.

SACRAMENTO COUNTY.

Prosperity Gravel Mining Company.—Suits have been brought against this company to settle title. The claim is near the Blue Ravine, Gray Wing and other prosperous drift mines a few miles from Folsom.

SAN BENITO COUNTY.

Benjamin E. Chase Mining Company.—This company (formerly the John R. Gentry Company), has a large force at work, and intends erecting a mill on its property at Ludlow, in the near future.

Cerro Bonito.—Development is progressing at this mine, near Panoche, S. F. Kennedy manager. A larger force is to be employed soon.

Gold Standard Consolidated.—A rich pocket has been found in this mine, 30 miles southeast of Victor. George Easton, of Los Angeles, is manager.

Bagdad Mining Company.—This company, operating mines, near Ludlow, E. H. Stagg general manager, has started its 50-stamp mill at Barstow. Five Huntington mills and a 200-ton cyanide annex are being added.

SANTA BARBARA COUNTY.

Gusher.—This new oil well in Santa Maria District gushes intermittently, sometimes yielding 4,000 or more barrels of oil a day.

SHASTA COUNTY.

James Gleason, of Igo, has a 40-acre patch of alfalfa growing on land near where the dredger was recently burned, and on which the sub-soil prospects even better than the ground where the dredger was working at the time of the fire.

SIERRA COUNTY.

Croesus Gold Mining Company.—This company (formerly the Plumbago), Mason W. Mather general manager, has struck a fine ledge of ore in its tunnel at Allegheny. The 10-stamp mill will be started.

SISKIYOU COUNTY.

The gentlemen who had the bonds on the Yreka Mining Company's property, at Rollin, and on that of the Evening Star and Central at the same place, have given them up. The Yreka Company wanted a larger payment for an extension of the bond than the parties were willing to give, and as they did not want the Evening Star unless they got the other mine as well, the propositions were both dropped.

Corey.—This group, in China Gulch, has been sold to J. M. Hadley, S. C. Phillips and Wm. Werst.

Highland.—On this mine, 12 miles from Callahan's, a 10-stamp mill is to be built.

Musick.—Very fine quartz specimens are being taken from this mine, in China Gulch, Russian Creek.

Punch Creek.—The ledge at this mine, on Humbug, has widened to 6 ft. of good looking quartz.

TRINITY COUNTY.

In the mining districts along Lower New River, there is considerable activity, especially near Quimby Creek.

Headlight.—The tanks, cyanide plant, etc., of this mine, near Carrville, recently destroyed by fire, are to be rebuilt.

Johnson.—At this mine, at Coffee, Maurice Osgood, has eight men taking out high-grade ore.

TUOLUMNE COUNTY.

W. P. Cunningham has bonded from J. F. and F. H. Baker a lot of mineral land near Carters for $12,000.

Bon Pedro.—At this mine, at Cloudman, Capt. W. H. McClintock manager, they are building roads, putting up buildings, etc., preparatory to active work. The old Mandveille shaft is to be sunk deeper, and a drift run to connect with the old workings.

Consolidated Eureka.—This mine, at Carters, belonging to Hayward, Hobart Estate and Lane, has been jumped on the plea that proof of labor has never been recorded. The mine was a producer up to August last, when work was stopped and machinery removed.

Providence.—This mine is to have an electrically driven diamond drill for prospecting purposes.

Sierra Gold Mining Company.—Mr. D. Giles, president of this company, has arranged to put a mill on the property.

YUBA COUNTY.

W. F. Hammon has brought in another prospecting drill to test dredging ground on the Drum farm north side of the Yuba River.

COLORADO.

CLEAR CREEK COUNTY.

(*From Our Special Correspondent.*)

Big Forty Tupnnel.—Denver people have installed a compressor on Chicago Creek, and are working men in the tunnel paying $1 a day and stock for the balance. The plan has not succeeded to any extent. The tunnel is contemplated to go about 6 miles, through from Chicago to Clear Creek, near Georgetown.

Coronation.—Francis X. Bannon has been appointed manager of this property at Idaho Springs. He states that new machinery will be put up at once, and the tunnel driven ahead.

Elkins Syndicate.—The power plant at Silver Plume is completed, and development is under way with machine drills. The new mill for the silver ores will be completed during the summer. Ben. C. Catren, Jr., of Georgetown, is manager. The development under way makes this the largest property in the upper end of the county. Senators Elkins and Hanna are interested.

Geological Survey of Clear Creek.—It is stated that H. L. Baldwin has been appointed to make a survey of the Clear Creek Quadrangle, comprising Clear Creek and Gilpin counties, and that stations are being established for the survey.

Hazelton Mining Company.—A new air compressor has been purchased for this property at Silver Plume, and as soon as it is installed the driving of the adit will start. The Shively and Baltimore claims were noted producers several years ago.

Marshall Russell Gold Miinng, Milling and Tunnel Company.—This property at Empire is still closed because of lack of funds. O. N. Marihugh, secretary, is in the East consulting with the stockholders.

Stanley Mining Company.—The litigation over this property at Idaho Springs is still in the courts. The main suit is brought by one of the stockholders to prevent a foreclosure, the object of which was nominally to perfect title.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Becky Sharpe.—A large hoisting plant is to be installed on this property, in Russell District. New buildings will be erected. Smelting ores running as high as $175 per ton have been shipped. Richie Hughes, Russell Gulch, with Denver men, has taken a lease and bond.

Clear Creek Mining and Reduction Company.—It is reported that the cage shaft of the Saratoga Mine, in Russell District, will be sunk 300 ft. to a depth of 1,300 ft. Developments in the 8th, 9th and 10th levels have shown large ore-bodies, and the deeper workings will put the property in shape for heavy shipments to the smelter. R. E. Nelson, Russell Gulch, is superintendent.

Colorado Tellurium Gold Mining Company.—Paterson, N. J., men are interested in a lease and bond on this porperty in Gregory District. A fine ore-body has been opened in a stope in the 510-ft. workings, carrying values between $100 and $200 per ton. Shipments are made to the stamp mills. Richard Borcherdt, Central City, is manager.

Cook.—The Eastern owners have resumed sinking and the shaft is to be sunk 500 ft. deep, or a depth of 1,450 ft. Sullivan air drills will be used. A new steel cable 2,000 ft. long has been received. O. B. Thomas, Black Hawk, is manager.

Edna Gold Mining Company.—A new concentrating plant has been built, with a capacity of 30 tons each 24 hours, and a 40-h.p. plant has been installed. The new plant has been built by Eastern capital, and is handling ores from the Mida property in lower Russell District. E. C. Miles, Black Hawk, is manager.

Great Mammoth.—Best & Clayton, lessees, have installed a 35-h.p. steam plant, and are sinking a lift of 200 ft., to gain a depth of 400 ft. Developments show better values. J. C. Clayton, Idaho Springs, is manager.

New National Tunnel Mining Company.—A new gasoline hoist has been received by this company for installment on its Susan Mary property on Bobtail Hill.

Paola.—W. L. Shull, of Russell Gulch, has a lease and bond on this property in Leavenworth Gulch, and has intrested Denver men. The main shaft is down 200 ft., and shaft buildings and machinery are to be installed. The ores run high in copper.

Snowdon Consolidated.—The property was purchased last winter by Messrs. George & Elgan, who intend to erect machinery and shaft buildings, and open the property . W. H. George, Central City, is manager.

Viola Gold Mining and Development Company.—Operations have been resumed by lessees on this group of claims in Russell District, and sinking will be continued. The company is to install machinery and erect top buildings on the Silver lode, believed to be the extension of the Waltham vein. Robert Hastie, Jr., Nevadaville, is manager.

GUNNISON COUNTY.

Cochetopa.—A 25-ton mill is to be erected on this property, in the Taylor Park section, by the Rough Rider Mining Company. It is said the process invented by Charles Snedeker, of Chicago, will be used.

Damascus Mining and Milling Company.—This company has started development work on 60 acres of mineral land on Loveland Mountain, above Alma. Machinery is to be installed and a tunnel driven. W. J. Buell, of Denver, is president; P. A. Phillips, of Pittsburg, Pa., secreatry, and A. A. Miller, of Grand Junction, general manager.

JEFFERSON COUNTY.

Clear Creek Mining and Reduction Company.—The differences between this company and the Smeltermen's Union, of Golden, have been settled. The men get an 8-hour day and a slight reduction in wages. The smelter is in operation.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

A large amount of diamond drill work is being carried on in the Leadville basin. The Bon Air, the Penrose, the Sixth Street, the Caribou and the Coronado are all using drills with success. Shipments average 2,700 tons daily, including the zinc and iron tonnage. The manganese product is light, but a heavier tonnage will go to the Pueblo steel works after July 1.

The west end of Leadville Basin is being thoroughly prospected, the most important work being that by the Sharpe Mining Company on the Laura and Daisy placers. Five small shafts that have been sunk, show an outcrop of lime and porphyry, while the gold washings are most favorable.

Banker Mining Company.—Attorney Edson, of New York, is straightening out matters complicated by the sudden death of John Guth. William M. Strong has been appointed manager.

Big Six.—Lessees are preparing for new work. There is some good ore, but litigation has delayed development.

Blue Ribbon.—On this virgin territory, in Big Evans Gulch, on the gold belt, a new shaft was sunk 150 ft. by local people, who are now drifting along the contact with good showing.

Fryer Hill Mines Company.—One hundred and fifty tons daily of good grade material come from the different shafts. The new Pride of the West shaft will be in the ore horizon in a few weeks.

Gold Basin.—Recent shipments netted 7½ oz. gold, 131 oz. silver and 13 per cent copper. The company is now upraising in two drifts on the rich but narrow vein.

Keystone Mining Company.—This is a Pittsburg concern, and several of the owners are here relative to carrying on work on a larger scale. It is understood that the Rey shaft will be sunk deeper.

New Leadville Home Mining Company.—Three new drill holes are being sent down from the 660-ft. level of the Penrose, all of which are showing ore and iron in the lower contacts. Later the shaft will be sunk to open these bodies. One hundred and thirty tons daily of good grade ore are mined from the upper workings.

Ohio & Colorado Smelting and Refining Company.—The company's plant at Salida is being improved by the addition of 18 new roasters of 170 tons capacity daily of low-grade material. The lead furnaces are making a very satisfactory showing.

Phoenix Mining Company.—This company, under the direction of Osgood and Sullivan, is operating the Sixth Street Mine, making an output of 75 tons a day of good grade oxidized iron ore from the 600-ft. level. They are also prospecting for new manganese bodies.

White Cap.—In the upper levels some good iron bodies are being developed, and shipments are being made by lessees. The low-grade sulphide bodies in the lower levels are not being handled at present.

PITKIN COUNTY.

Argentum-Juniata.—Several years ago this company borrowed a large sum of money and gave a mortgage on its property. Recently the deed was foreclosed and the property bid in at public auction by the Colorado Springs Trust Company, trustees for the creditors, for $42,589.

Red Mountain Mining, Milling and Development Company.—Four claims of this company's property, in the Red Mountain District, Lincoln Gulch, have been sold to Eastern men, it is said. The deal was effected through Dr. J. F. Willard, of Colorado City, and John Hughes and Frank Osborn, of Kansas.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

Col. Meeks is about to resume work on his tunnel in the Burrows Park District, and will use power drills.

Anglo-Saxon.—This property, operated by the Gold King Mining and Milling Company, recently cut the vein 1,200 ft. from the tunnel mouth, at several hundred feet depth. Preparations are being made to ship the ore crude.

Aroostook.—This Silverton property, also the Emma, on Anvil Mountain, will be started at once by John Rowland. Ore broken years ago will be shipped at once.

Bald Eagle.—Carver & Butler have struck good ore in the Bald Eagle, in Cement Creek District, and are shipping a car-load per week.

Beecher.—Mrs. E. G. Storber, formerly of the Silver Lake, has secured the Belcher on Sultan Mountain, near Silverton, and will begin development soon.

Big Five Mining Company.—Two contracts of 100 ft. each have been completed on the Big Five group, at Howardsville, and similar contracts will be awarded in a few days.

Bon Homme.—This property, at Burrows Park, owned by a St. Louis company, will soon start work.

Henrietta.—The seventh level has reached the 1,800-ft. mark, and connection has been made with the upper workings of this Silverton mine. A force is engaged in putting things in shape to begin shipping.

Index Mining Company.—This company's mines, in Mastodon Gulch, are being put in shape for inspection by Denver people, who are negotiating for their purchase.

New York-Brooklyn.—This Silverton property is again shipping rich ore under the direction of its owners, Manion & Murphy, who have leased and will operate the Lonne & Johnson Mill to treat the second grade product.

Royal Mining Company.—The cross-cut, near Silverton, is in 1,000 ft., following a vein recently disclosed.

Sunnyside.—The strike has been settled and an agreement signed for two years; 140 men returned to work, and the mine and mill are running full capacity.

Tobasco.—This mine will soon start with a full force, as will also the new 10-ton mill.

SUMMIT COUNTY.

Aetna and Vesuvius.—These mines on Fletcher Mountain, near Kokomo, are to be started soon by Victor E. Meyer, who has control.

Wilfley.—This property is steadily worked. The mill is running day and night and turning out a large amount of concentrates. E. E. Byron is manager.

TELLER COUNTY—CRIPPLE CREEK.

The mining corporations of the Cripple Creek District won an important case recently in the District Court, when Judge Lewis decided the tax appeal from the decision of the County Commissioners in their favor. The parties to the suit were the Independence Gold and Mining Company, the Monument, Pinnacle, Ben Hur, Jennie Sample, Des Moines and C. K. & N. companies, which companies sought to reduce their assessments. The decision of the court in every case, except the Monumept, cut down the assessments from about $1,000 an acre to $150. The decision will be

appealed to the Supreme Court by the commissioners.

Prudential Gold Mining Company.—This company is about to erect a 50-ton cyanide mill for the treatment of low-grade Cripple Creek ore. The exact location is as yet undecided. The company is capitalized at $500,000; the officers are: Thomas Cornish, president; Dr. J. A. Dunwoody, vice-president; E. P. Arthur, treasurer; Dr. Z. E. Funk, treasurer; John Stovekin, general manager.

(*From Our Special Correspondent.*)

Cripple Creek Enterprise Gold Mining Company.—This company has resumed work after putting in a new plant. It is understood that sinking and drifting will be done. The company has a franchise to mine ore from under the streets and alleys of a portion of Cripple Creek.

Geological Survey of Cripple Creek.—Work on the re-survey of the district by Waldemar Lindgren is to begin immediately. Mr. Lindgren is here, and has spent several days looking over the camp.

Ironclad.—Considerable work is being done. The ore goes to the Globe Reduction Company, which controls both the mine and the mill. The low-grade ore is admirably adapted to cyaniding.

Stratton's Cripple Creek Mining and Development Company.—Several more leases have been let on the Gold and Globe Hill portion of this property, none, however, including any of the principal workings. So far no leases on Bull Hill have been let.

Streator & Cripple Creek Mining Company.—This company is preparing to do considerable prospecting on its three claims, near the station of Midland, on the Midland Terminal Railroad, on the side of Pikes Peak. At present the main work is in a shift now about 100 ft. deep. The property is equipped with a steam hoist. James Parfet, of Gillett, is in charge.

IDAHO.

BLAINE COUNTY.

Della Mountain Mining Company.—The two-fifths interest in this company's Idaho-Democrat group of claims, near Hailey, owned by Thomas Brennan, is reported purchased by Irvine E. Rockwell, on a basis of $250,000 for the property.

IDAHO COUNTY.

Elk Gold Mining and Milling Company.—The force on this company's property at Buffalo Hump is to be increased by 15 men. James Slavin has charge.

Moose Creek.—A second clean-up this season was made recently from this placer in the Elk City section. Charles P. Richardson is manager and principal owner.

Thunder Mountain Gold Company.—A 5-stamp mill is to be erected at this company's mine, 60 miles east of Stites. Sherman McKibben, of Elk City, is superintendent.

KOOTENAI COUNTY.

Idaho Continental.—The lower drift in the Blue Joe tunnel is in about 600 ft., and a vertical depth of 400 ft. has been attained. The property is on Mount Klockmann, near Porthill. A large body of concentrating ore has been opened, and the erection of a concentrator is contemplated. A. Glockmann is managing director.

SHOSHONE COUNTY.

Alameda.—A rich strike of galena is reported at this mine on the east fork of Nine Mile Creek, about 5 miles from Wallace. The tunnel is in 450 ft. William Farmer is the principal owner.

(*From Our Special Correspondent.*)

Contractor Fred Phair has about 130 men and teams at work on the construction of the electric power line from here to the Coeur d'Alenes, a distance of 100 miles, and expects to have the plant ready to supply power to the mine about August 1. A transformer station will be built at the Hecla.

The big mine owners of the Coeur d'Alenes have agreed to join interests in fighting the sale of their mines at the hands of the sheriff for taxes on July 7. They will attack the late assessments on the ground that they were made arbitrarily by the assessor, without regard to the true value of the mines.

Hecla Mining Company.—This company, controlled by Finch & Campbell, and operating the Hecla Mine up Canyon Creek in the Coeur d'Alenes, has resumed the payment of dividends, and yesterday paid $20,000, or 2c. a share. The property paid $100,000 two years ago in five dividends, but was then shut down for a time under an arrangement with the mine owners and the American Smelting and Refining Company to curtail. A few months ago it started again, and has been shipping about 1,100 tons of concentrates a month, with a crew of 100 men. The company has purchased the old Gem Mill, owned by the Milwaukee Mining Company, for $50,000, and has paid $20,000 on account. That amount was disbursed by the Milwaukee Company as a dividend yesterday. The Milwaukee has been idle several years.

GEORGIA.

LUMPKIN COUNTY.

(*From Our Special Correspondent.*)

Briar Patch Mine.—This mine, near Auraria, is being actively worked. A meeting of the owners was held recently ,and the manager was instructed to begin work at once on a new shaft and tunnel.

Dahlonega Gold Mining Company.—At the annual meeting in Dahlonega, June 23, all the old officers were re-elected. The company is now engaged in cutting a ditch to convey water to its placers, near Briar Patch. The ditch will be 20 miles long, and over 9 miles are completed. The water will be used to hydraulic on the property.

Etowah Gold Mining Company.—This company is now putting in new machinery for working the ore from the old Betz Mine, near Auraria. The shaft is now down 200 ft., and is showing abundance of ore. Craig R. Arnold is manager.

Ingersoll & Crisson Dredge.—This new dredge boat on the Chestatee River, was started up last week, and is reported to be doing very well.

Ivey Mine.—This mine is being worked by Henry Sparks and Lewis Price as lessees. They are cutting a tunnel which will drain the property, and which is expected to cut the vein about 200 ft. in.

ILLINOIS.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

Continental Coal Company.—This company, which was organized in Springfield some months ago to sink a mine at Pawnee Junction, is about to dissolve on account of dissentions among the stockholders, some of them refusing to pay the stock subscribed. There are two old boilers and an old pair of hoisting engines, with some lime and cement on the ground, but the company has not broken ground. This is simply the bursting of a bubble blown by last winter's coal business. Most of the other companies, however, formed in this vicinity, are on a sound basis, and are making good progress.

Sangamon Coal Company.—Frank E. Fisher, manager, of Springfield, expects the new plant will be ready shortly after the middle of July with a new steel tower and new hoisting engines.

INDIANA.

CLAY COUNTY.

(*From Our Special Correspondent.*)

Merchants and Manufacturers' Coal Company.—This Chicago company has been made defendant in a number of suits and a petition for a receiver is filed. Mechanics' liens amounting to over $8,000 have been filed. The company holds options and leases on several hundred acres of coal lands.

GREENE COUNTY.

(*From Our Special Correspondent.*)

Linton.—Over 600 miners struck at these mines on account of the discharge of one of the men who did not enforce the standard rules. The men are striking in strict violation of their contract with the company. The matter has been reported to President Mitchell, who ordered the men back to work pending an investigation. The men, however, have refused.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Calumet & Hecla.—A 152 by 56-ft. stone addition to the Hecla blacksmith shop is being built.

Champion.—The fourth head at the mill has been installed, and is operated part of the time. The limited compressor capacity at the mine prevents the addition of more drills, and there will not be a material gain in output until the new 100-drill Nordberg air compressor is installed.

Copper Range Railroad.—A passenger and general freight service has been instituted on the Calumet extension.

Franklin.—A combined carpenter and cooper shop is being erected at the stamp mill, on Grosse Point. It is a frame structure, 40 by 75 ft., sheeted with corrugated iron. The boiler house is being enlarged and a 200-h.p. Burt locomotive firebox boiler, with 84-in. shell, will be installed. The machinery for the fourth head has been ordered, and will be delivered in two months by the Allis-Chalmers Company, of Chicago.

Isle Royale Consolidated.—The Eastern officers have decided to reopen No. 1 shaft and start another head at the mill about July 15. Rock shipments will be increased to 1,000 tons per day. Eighteen drills will be used in each shaft, requiring 125 more men at the mine and 15 at the mill.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Allouez.—A 41-ft. shaft, reaching the ledge, has been opened near the new Kearsarge shaft to drain the surface water. Work on the main shaft has been resumed, and sinking is well advanced.

Miskwabik Development Association.—At a meeting of the representatives of this concern and the Federal Copper Company, Limited, and the Union Land and Mining Company, in Boston, Mass., last week ,a plan for a consolidation was agreed upon. H. F. Fay, of Boston, will be president, and the Eastern office will be at 60 State Street, Boston. Dr. L. L. Hubbard, general manager of the Champion Mine, at Painesdale, is in charge of the explorations.

Mohawk.—Portions of the new Nordberg hoist for No. 4 shaft have been delivered by the Nordberg Manufacturing Company, of Milwaukee, Wis., and the work of installing has started. It is a double-cone drum duplex hoist, with steam cylinders 24 ins. in diameter by 60-in. stroke, each half of the drum carrying 2,000 ft. of rope.

MINNESOTA.

(*From Our Special Correspondent.*)

Shipments of ore from Minnesota continue nearly as large as ever, but from other Lake ranges they are falling off somewhat. Vessel delays on account of coal detentions are frequent. Shippers aside from the Steel Corporation are doubtful as to their policy, and mines are cutting off night shifts and reducing outputs to a certain degree.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

Biwabik.—At this mine a shipment this year of about 1,000,000 tons is planned, an increase of 375,000 tons over last year. The mine is shipping over the Duluth & Iron Range road to Two Harbors, giving a shorter haul, and adding a very large tonnage to the Iron Range Road. The Misabe line will hereafter haul nothing from any point east of Eveleth and Virginia. Its chief increase in traffic will hereafter come from the Hibbing District.

Cleveland Cliffs Iron Company.—This company has a rather small ore-body shown up in section 10, T. 56, R. 23, and a town site is being put on the market there by residents of Hibbing and Virginia. No other mines have yet been proved in the immediate vicinity.

Crescent.—This property, which has just been bought by the Minnesota Iron Company for $125,000 for the 25c. lease, contains about 2,000,000 tons of good merchantable ore lying in the shape of a crescent, in the southwest corner of section 21, T. 58, R. 20, southwest of the Jordan Mine. Its fee is in Messrs. Alworth, Hull & Boeing, who get 25c. a ton on all ore mined.

Duluth.—This mine, at Biwabik, is to make a larger shipment than before, and is to send its ore via the Duluth & Iron Range to Two Harbors. The ore goes to Jones & Laughlins furnaces.

Gates Iron Company.—At the Gates explorations, in section 13, T. 58, R. 20, 80 ft. of ore have been found in one hole.

Higgins.—This mine, of the Minnesota Iron Company, in section 5, T. 58, R. 17, is not as active as was expected, and may do no shipping this year. The company has changed its plans as to stripping, as certain negotiations that were under way for other lands were not carried to conclusion. The Higgins is not a very large property.

Jordan.—Part of the force has been laid off indefinitely. The mine was expected to produce 350,000 tons this year.

Pearce.—Sixty-five men have been laid off at this comparatively small property, near Hibbing. The mine will be worked day shifts only for some time, and will produce about 50,000 tons this season.

Tesora.—This new mine, an unopened property in the southwest side of section 13, T. 57, R. 22, is the only development between the Stevenson and Clairton properties. It contains about 1,000,000 tons, and is in the hands of the Tesora Mining Company.

Woodbridge.—At this exploration in section 15, T. 58, R. 19, one hole is 120 ft. in ore.

MONTANA.

BEAVERHEAD COUNTY.

Indian Queen.—The new 30-ton smelter at this property in the Birch Creek District has started. It is the first copper smelter erected in the county. The mine and smelter are about 12 miles from Apex, the nearest railroad station for coke and supplies.

(*From Our Special Correspondent.*)

Greenwood Milling Company.—All the machinery in the concentrator and the pneumatic cyanide mill has been sold, and will be removed to Madison County. The management of the Bismarck-Nugget Gulch Mining Company are the purchasers.

DEER LODGE COUNTY.

(*From Our Special Correspondent.*)

Allen Gold Mining Company.—W. R. Allen, of Anaconda, has returned from the East, where he arranged financial matters in relation to this company, and intends building a concentrator and cyanide plant on the quartz properties at the head of French Gulch.

FERGUS COUNTY.

(*From an Occasional Correspondent.*)

Ammon-Stivers Mining Company.—The suit instituted by Robert A. Ammon in the name of this company against the Great Northern Mining and Development Company has been dismissed by the United States courts, having been withdrawn by Ammon upon discovering, after the taking of testimony, that he had no case. Ammon and the Ammon Stivers Mining Company have executed quit claims to all of their alleged interests in Fergus County. Incidentally, it may be noted, that Ammon is now in jail in New York awaiting sentence, having been convicted of receiving stolen goods.

LEWIS & CLARKE COUNTY.

Bismarck.—This group of claims, 17 miles east of Helena, is being developed by Kenneth Reeves, it is supposed, for Eastern men. Quite a force is employed.

(*From Our Special Correspondent.*)

Big Indian.—The 60-stamp mill on this property has been running, crushing six tons to the stamp. Electric power at $50 per h.p.-year, is used in place of steam. The mill is modern, and is making a satisfactory profit from a low-grade material.

MADISON COUNTY.

Little Kid.—A 3 years' bond on this property, 17 miles from Norris, has been given by the owner, Col. Chisholm, to J. P. Ormond, Jeremiah Hore and Harry Bush, of Jardine, and E. A. Dawes, of Livingston. A 10-stamp mill, a 20-ton Bryan mill and a sawmill go with the bond. The lessees intend erecting a 100-ton concentrator.

(*From Our Special Correspondent.*)

Bismark-Nugget Gulch Mining Company.—The cyanide mill formerly in use at the Greenwood mill in Beaverhead County has been purchased by this company and will be erected at the company's property on Nugget Gulch.

MISSOULA COUNTY.

(*From Our Special Correspondent.*)

Big Blackfoot Midland Railroad Company.—The Big Blackfoot Milling Companny will construct a logging road from Bonner, where the sawmills of the company are located, up and through Comas Prairie to a point near the Copper Cliff Mine. The capital stock is placed at $150,000, with John R. Toole, Kenneth Ross, Frank Vogel, Frank Toole and T. C. Marshall as directors. The road will be one of the auxiliary companies to the Amalgamated Copper Company.

Butte & Garnet Mining Company.—The last payment has been made by this company on the Grant & Hartford claim at Garnet, which the company has been operating on a lease and bond. J. J. Farrell is manager.

Red Cloud.—It is reported that Dr. Mussigbrod has opened 4 ft. of $32 gold ore in this mine. He intends to tap this ore-body by a 400-ft. tunnel.

NORTH CAROLINA.

ROWAN COUNTY.

(*From an Occasional Correspondent.*)

Gold Hill.—This property, which was capitalized by New York men for $5,000,000 some years ago and afterwards went into the hands of a receiver, is now lying idle, filling with water. The Randolph shaft is the deepest east of the Appalachians, being down 900 ft.

Union Copper Company.—Little work is being done. About 14 ment are sinking. The troubles of this company seem to come from its past management and the failure to find a practical method of treating the ore.

OREGON.

BAKER COUNTY.

(*From Our Special Correspondent.*)

Black Eagle.—Manager J. F. Meisle, of Malheur City, states that he is milling in his 20-stamp mill 120 tons of ore in 24 hours. The mortars are No. 24 Union Iron Works pattern, narrow, low issue, no inside plate in back, chuckblock in front, 12-in. lip amalgamating plate at discharge, stamps dropping 110 per minute, 4½ to 6-in. stroke, crushing to 30-mesh, slow screens.

Bonanza.—It is stated that the cross-cut from the 1,000-ft. level has opened the main Bonanza vein. The management will neither confirm nor deny reports of its richness.

Gem.—The Geiser-Hendryx Investment Company, of Sumpter, has taken a bond for the reported sum of $90,000 on this mine, near Baker City. The shaft is 500 ft. deep, and the equipment includes a complete combination 10-stamp mill and small hoist.

Iron Dike.—The Ladd Metals Company, G. W. McDowell, of Homestake, manager, has secured the output of this copper property, on Snake River, and is now beginning work on a 100-ton smelter, near the property. The same cmpany owns the mines and smelter at Mineral City, Idaho, 150 miles up the river.

Morning.—The 5-stamp Bryan mill constructed by Ames, Simmonds & Cooper, of Greenborn, is now running.

GRANT COUNTY.

(*From Our Special Correspondent.*)

Belcher.—A fourth shoot on adit level is reported opened about 1,600 ft. from the portal, and a raise started to connect with the Golden Gate workings. President Daines, of Seattle, Wash., is reported to have ordered a portion of the 10-stamp mill.

Blue Bird.—President O. C. Wright, of Sumpter, says the ore treating plant is ordered. It is to have a daily capacity of 100 tons, concentrating and amalgamating. In the equipment will be No. 2 gyratory and roll-jaw crushers, and four concentrators. A 75-h.p. boiler will be added to present steam plant.

Comstock.—The main vein of this property, Peter McGerry, of Red Boy, superintendent, has been opened by a cross-cut tunnel.

Gold Bug-Grizzly.—Superintendent J. J. Hennessey, Sumpter, has unwatered the shaft, and is sinking an additional 200 ft.

Last Chance.—Manager L. G. Lilley, of Cableville, has placed an order for a small hoist, 75-h.p. steam plant, and a small Cameron pump.

PENNSYLVANIA.

ANTHRACITE COAL.

The Philadelphia & Reading Coal and Iron Company makes the following statement for May and the 11 months of its fiscal year, from July 1 to May 31:

	May.	11 mos.
Earnings	$2,952,837	$20,098,906
Expenses	2,486,080	17,641,079
Net	$466,757	$2,457,827

For the 11 months the gross earnings, as compared with the previous year, show a decrease of $6,228,861, and the expenses a decrease of $6,912,993; leaving an increase of $684,132 in net earnings.

BITUMINOUS COAL.

A. J. Leonard, formerly superintendent of the A. R. Budd Coal Company, and J. A. Ray recently purchased 1,000 acres of coal land, situated between Burgettstown and the Dinsmore tunnel, along the Pittsburg, Cincinnati, Chicago & St. Louis Railroad. The price was $100,000. Development work will begin at once, and a large plant will be installed. The coal will be used for the locomotives on the road.

Husted-Seamens Coal and Coke Company.—This company, capitalized at $500,000, has been organized in Uniontown, with the following directors: J. F. Husted, president; Isaac W. Semans, treasurer, and Frank M. Semans, Albert Husted, J. Edgar Hustead and W. Barton Buson. The company owns about 1,000 acres of coal land in Luzerne Township, and intend erecting 200 coke ovens next year.

SOUTH DAKOTA.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

Columbus Consolidated Gold Mining Company.—A water right has been purchased on Falsebottom Creek.

Golden Reward Mining Company.—The Tornado, Sun Dance and Little Bonanza claims are worked. The cyanide plant at Deadwood is treating 125 tons of ore daily, and shipments are being made to smelters at Denver and East Helena. Harris Franklin, general manager, says the smelter at Deadwood will start as soon as the price of coke comes down. The company's mines in southern Ruby Basin have filled with water since the smelter closed.

Homestake Mining Company.—It is stated that an electrical power transmission plant is to be installed on Spearfish Creek.

Horseshoe Mining Company.—It is announced that the new cyanide plant in Ruby Basin will start August 1. It is a wet process, 120-stamp mill, and will depend upon the Mogul shaft for water. The mill is built on the top of a hill, and the water must be raised 300 ft. after being pumped out of the shaft.

Washington Consolidated Mining Company.—At the annual meeting J. J. Schlawig, of Sioux City, was elected president and treasurer; Henry Schlawig, of Sioux City, vice-president; Sol Rosenthal, Deadwood, secretary; J. J. Schlawig, superintendent, has cleared the old tunnels and retimbered the mine.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Holy Terror Mining Company.—The Holy Terror Mine is supplying the Keystone 20-stamp mill. The concentrates are being held for shipment to a smelter. Prospecting continues in the Keystone Mine.

Mainstay Gold Mining Company.—T. R. Griffith, late of Breckinridge, Colo., is superintendent of this company, recently organized for the purpose of purchasing the Ida Florence Mine and the Bismarck 40-stamp mill. The mine is being prepared to supply the mill.

TENNESSEE.

ANDERSON COUNTY.

Tennessee Coal Company.—Operations have been resumed at this company's mines at Briceville, though on a small scale, as the union has not been recognized, and the company may have trouble for some time in securing men.

WHITE COUNTY.

Bon Air.—The engineering work on the 400 coke ovens to be built at the mines, near Bon Air, is completed by Reilly & Co., of Birmingham, Ala. Alabama contractors have been asked for bids.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—The Salt Lake banks report for the week ending June 26: Ores and concentrates, $147,200; base bullion, $166,300; gold bars and cyanides, $9,800.

BAKER COUNTY.

(*From Our Special Correspondent.*)

Beaver Consolidated.—At over 300 ft. a good grade of copper ore is reported.

Newhouse Mines.—Plans are almost completed for active work on the concentrator and smelter for the Cactus Mine. The first contracts will be let, it is stated, by July 15.

IRON COUNTY.

(*From Our Special Correspondent.*)

Johnny.—At this property an average of 50 tons of ore is extracted daily.

Venus.—This Stateline company has succeeded in getting a loan to carry on development work, and to purchase machinery.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—For the week ending June 26 shipments amounted to 153 cars, as follows: Ajax, 2; Black Jack, 6; Carisa, 2; Bullion-Beck, 9; Centennial-Eureka, 37; Dragon Iron, 29; Eagle & Blue Bell, 1; Eureka-Hill, 15; Gemini, 13; Grand Central, 15; Lower Mammoth, 2; Star Consolidated, 6; Uncle Sam Consolidated, 1; Victor Consolidated, 3; May Day (concentrates), 1.

Illinois.—This property, adjoining the Raymond, has been bonded to Frank J. Westcott, private secretary to Senator Kearns, for a consideration, it is said, of $200,000.

Lower Mammoth and Black Jack.—The joint survey made by the Lower Mammoth and Black Jack Mining companies has shown that the workings on the 1,100-ft. level of the former penetrated the territory of the latter 190 ft., and that the face of the drift is directly under the Black Jack shaft. Much rich ore has been taken out of the trespassed territory during the past few months. The Black Jack shaft will be continued at once. No settlement has been agreed on.

May Day.—The jigs are handling about 25 tons of ore daily.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—Shipments of copper bullion during the week ending June 26 were four cars, 240,000 lbs.

Bingham-New Haven.—Work suspended indefinitely pending some changes in plans of operations of the Bingham property.

Columbus Consolidated.—The plans for the 500-h.p. electric plant to be erected in Little Cottonwood Canyon are completed, and Manager Tony Jacobson will award contracts for the machinery and construction next week.

Dalton & Lark Tunnel.—This long bore being run by the Bingham Consolidated Comapny, is in 6,100 ft., and is nearing the Brooklyn vein. At present the tunnel is discharging water at the rate of about 2,00 gals. per minute.

Great Western.—A contract has been let by David Evans, manager, for the installation of an air compressor and other machinery at this Alta property preparatory to starting work on the 1,500-ft. tunnel.

United States Smelter.—Copper bullion shipments for the week ending June 26 were four cars, 239,622 lbs.

Utah Consolidated Smelter.—Shipments of copper bullion for the week ending June 26 were four cars, 241,000 lbs.

Yampa Smelter.—Contracts will be let soon for machinery and structural material. Excavations are completed.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Daly-Judge.—Director John J. Daly states that this Park City Company's mill is working satsfac-

tory since equipped with the Sherman slimes settling tanks, and is turning out about three cars of concentrates daily.

TOOELE COUNTY.

(From Our Special Correspondent.)

Honerine.—Manager Willard F. Snyder has returned from the East with instructions to proceed with the erection of a 100-ton concentrator at the mouth of the drainage tunnel at Stockton.

Ophir-Queen.—The new hoist is in commission.

UINTAH COUNTY.

(From Our Special Correspondent.)

The United States Government will award contracts for the survey and platting of the Uintah Indian reservation about July 15. The cost, it is estimated, will be approximately $100,000. There will be about 20 contracts in all, and the clerical force in the office of the surveyor general in Salt Lake City is busily engaged in compiling the bids. The survey will involve an area of 2,250,000 acres, a large portion of which is mineral land.

FOREIGN MINING NEWS.

ASIA.

SIBERIA.

Siberian Mining Company.—This recent incorporation, composed largely of Colorado men, has been organized at Colorado Springs, to carry on mining operations. About 2,200 acres of gold-bearing territory are said to be acquired. Among the incorporators are Thomas F. Walsh, William H. Brevoort, Clarence M. McCormick, J. B. Haggin and H. C. Perkins.

CANADA.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—Eleven pumps are constantly in operation pumping out No. 1 Mine, which was flooded to put out the fire that started March 9. The water has been lowered 40 ft. and part of the burned area has been reached.

YUKON.

(From Our Special Correspondent.)

Advices are to the effect that the clean up this year at the Klondike will exceed that of the previous year. On El Dorado, Hunker and Bonanza creeks the yield is much larger. Duncan Creek is turning out well, and is considered the best of the new camps. The hydraulic plants installed last year have been successful and helped the output. Many more plants have been shipped in this summer.

MEXICO.

COAHUILA.

Mexican Coal and Coke Company.—An explosion of gas at this company's Las Esperanzas coal mines, at Barwatoeran, recently killed 24 miners and injured about 50 others. The disaster was caused by a defective lamp.

NEW CALEDONIA.

Exports of ores from the colony for the calendar year are reported by the *Bulletin des Commerce* as below, in metric tons:

	1901.	1902.	Changes.
Nickel ore	132,814	129,653	D. 3,161
Cobalt ore	3,123	7,512	I. 4,389
Copper ore	1,088	3,721	I. 2,633
Chrome ore	17,451	10,281	D. 7,170

The Societe le Nickel is installing an electric plant at Thio. Operations have been resumed in the mines at Kouaoua and Bornet, and arrangements are being made to start work at Boa-Kaine.

SOUTH AMERICA.

CHILE.

New Paccha & Jazpampa Nitrate Company.—The trading profit in 1902 amounted to £6,975, which is necessarily smaller than 1901, owing to the interruption of work during the erection of new machinery and tanks at the Jazpampa to treat the low-grade caliche. The directors have started a machinery reserve account by £1,000, and have placed £1,000 to the general reserve fund. The new maquina is working satisfactorily, and on the first month's manufacture of 23,000 qtls. of nitrate of soda there was a saving of 6d. per qtl. The ordinary shareholders have received a dividend of 6 per cent, and the preferred 10 per cent.

Santa Rita Nitrate Company.—A dividend of 5s. per share has been declared, making 10 per cent for 1902. In that year the gross profit was £23,272, from which should be deducted dividends and expenses, leaving £4,968 to be carried forward. It has been decided to erect a new maquina to treat the deposits of costra in the Santa Rita ground, estimated to contain fully 9,000,000 qtls.

BY CABLE.

(From Our Special Correspondent.)

Sydney, N.W.S., July 1.—The mines at Broken Hill, New South Wales, are closed down by reason of a lack of water. A large supply of ore remains on hand at the smelters, situated at Port Pirie, so the production will not cease yet awhile. In order to hasten atmospheric precipitation of water, rainmakers are at work.

MINING STOCKS.

(Full quotations are given on pages 38 and 39.)

New York July 1.

Expectation of an increased dividend on Amalgamated and the resumption of foreign investment and inside support in this stock and Anaconda, were the important factors that gave cheerfulness to the market this week. Unfortunately, however, the persistency of some holders in offering shares liberally whenever prices advance, coupled with the weak metal market, have prevented the professional operators from executing their plans. Then again, this seems an unpropitious time to resuscitate the stock market, as in midsummer a good part of the investing public is on vacation. On the other hand, the recovery in share values from the recent low-water mark, must have a beneficial effect later on when speculation begins again. The raising of Amalgamated to $56, and Anaconda to $22.50, has established a basis upon which market quotations may be made without creating alarm.

On curb a better feeling has also prevailed in the copper shares; and in the specialties, Greene Consolidated and Tennessee have shown more activity, the former selling around $23, and the latter at $29.25 @$32. White Knob, of Idaho, made odd sales at $12.50@$13, and British Columbia at $4.75.

The Tennessee Copper Company declared its first dividend on July 1 of $1.25 on 175,000 shares. In the six months ending June 30 there was produced 6,000,000 lbs. of copper, which yielded an estimated profit of $295,000. The company was incorporated in 1899 with a capital of $5,000,000 to operate the Burra Burra Mine and other mineral property in the Ducktown District, Polk County, Tenn. By able management the company has succeeded in the profitable treatment of low-grade copper ores.

Gold and silver securities showed some expansion, though prices are still considered low. Portland, of Cripple Creek, Colo., brought $1.33; Elkton Consolidated, 45c.; Isabella, 17c.; while Vindicator exchanged 500 shares—the first in a long while—at 85c. In the Comstock list, room traders are doing the most business. Consolidated California & Virginia changed hands at $1.65; Ophir, $1.65@$1.75; Mexican, $1.30; Union Consolidated, 88@90c.; Sierra Nevada, 71c., and Yellow Jacket, 69c. Silver Hill, also in Nevada, sold at 90c.

Boston. June 30.

(From Our Special Correspondent.)

Market fluctuations have been very narrow during the week, and trading light, except at a few spasmodic moments, when a moderate flurry in some specialty would occur. The weakening in the price of copper has not brought any material change in the temper of speculation. The public is holding aloof from copper shares for the lack of a leader. Lawson, with his old-time vim, could excite quite an enthusiastic following, but there is nothing in evidence that points to such a happening.

Utah Consolidated, which was pressed for sale a while ago, now shows more buoyancy. After selling at $28 it has rallied to $29.75. The secret of the late weakness is now out. It seems that the dust and smoke from its smelter threatened many suits from the farmers who report ruined crops, etc. This matter is now being attended to and new dust flues are being put in. Osceola rose $2.75 to $57. Talk on Osceola is bullish, based on prospective earnings and better management. It is estimated that 4c. per pound is being made on its copper, and in the next six months, with no construction charges, the company ought to accumulate close to $500,000.

Copper Range Consolidated has risen $2.37½ to $55.87½ on better trading. The June product is expected to be its best. Contracts are being let for the new smelter. Calumet & Hecla took a $20 drop to $430, but subesquently jumped up to $465 per share. Bingham Consolidated has advanced not quite $1 to $28.50. A local house issues a circular in which it says that Bingham has no floating debt, and is producing at the rate of 10,000,000 lbs. of bullion per annum.

Mohawk is up $1.75 during the week to $45.50; Centennial, $1.62½ to $20.87½, and Michigan $1.50 to $9.25. Buying of the latter has been in good-sized lots, but nothing has yet developed to explain the advance. Wolverine has advanced $2 to $67.

United States Coal and Oil showed some activity late last week at from $11.62½ to $12.50. The company expects to be producing coal from its new porperty by November 1. The oil production is now off to 700 bbls. per day, and profits are being put back into the property. Franklin is firmer around $9 on the reported strike of rich ground on the conglomerate at the Junior.

Dominion Coal made a sharp advance of $7.50 to $99, ex-dividend, reacting to $95. Dominion Iron has varied from $18.25 to $16, closing at $17.50. These fluctuations have been due to a report that the $1,500,000 steel bonds might not be issued unless the Dominion Government raises duties on the products.

Tamarack holds at $117, and Quincy has eased off $3 to $100.

Colorado Springs. June 26.

(From Our Special Correspondent.)

The market closed this week with a strong undercurrent in the mines list, but with the prospect list in some disfavor. There was a slight general decline from the close of last week to the middle of this, with the mines list more than covering all losses.

Prospects, however, have suffered, the decline being steady and general throughout the list. No good reason can be given for this, unless it is the fact that investors are turning their attention to mines rather than prospects.

C. K. & N. held steady at 21c. during the entire week, with but little stock changing hands. Elkton closed the week strong, 41c. being bid, but no stock for sale at that figure. El Paso was practically stationary, ranging from 60 to 60½c. during the week. Golden Cycle at the beginning of the week sold at 70c., declining to 67½c. after the books had been closed on account of the declaration of a 3c. dividend. None of the stock was offered to-day, however, at less than 70c. Isabella sagged from 15 to 14¾c., recovering to the former figure. Last Dollar, which has long been inactive on the Exchange, again came to the front, 10,000 shares changing hands to-day at 50c. Portland closed last week, selling at $1.27, from which figure it declined to $1.23, only to react to $1.30, at which it closes the week.

In the prospect list Gold Sovereign declined from 3⅞c. a week ago to 3⅛c. to-day; Little Nell from 2⅞@2⅝c.; Mary Nevin from 3½@3¼c., and the lower priced stocks in proportion.

Salt Lake City. June 27.

(From Our Special Correspondent.)

During the week ending June 27 the amount of business transacted on the Salt Lake Stock and Mining Exchange amounted to 182,585 shares, which brought $86,391. The market was dull and listless, and the week's sales were the lightest of the year.

Consolidated Mercur made some advances, and the stock is getting well up towards its former price again; the work of installing the Moore slimes process will not be completed until about July 15. Sacramento, also of Mercur, remained practically unchanged; the directors have declared the regular dividend of $5,000 payable on July 1.

The principal sales of the week were made in Tintic stocks, and these, with only one or two exceptions, are lower than a week ago; the worst sufferer being Lower Mammoth, which sold as low as 72½c. The price was affected by the probability of trouble with the Black Jack, an adjoining property, which has demanded an accounting for ore alleged to have been extracted from the territory of the latter. Only 210 shares of Daly-West was sold at $41.95@$42.15. Comstock went at 83@90c.; California at 15½@17½c,. and Daly-Judge at $10.00@$11. With the warm weather on in earnest again, a light business is anticipated for several weeks.

San Francisco. June 27.

(From Our Special Correspondent.)

On the old Exchange a little more interest has been shown in Comstock shares, especially in the North End stocks. Prices show very little variation. A few are a little better, perhaps, but the tendency is not strong. Consolidated California & Virginia sold at $1.65; Mexican, $1.35; Sierra Nevada, 80c.; Hale & Norcross, 70@75c.; Belcher, 53c.; Chollar, 31c.; Savage, 25c.; Gould & Curry, 45c.

On the San Francisco & Tonopah Board business was fair, and rather increased in volume towards the end of the week. Prices are very steady in tone, and quite a demand seems to have sprung up, not only for Tonopah stocks, but for some of the others dealt in on this exchange. Some quotations noted are: Wild Goose, $2.80@$3; Tonopah Belmont, $2.30@$2.35; Tonopah Union, $1.40@$1.45; Tonopah North Star, 48@50c.; Gipsy Queen, 28c.; Gold Mountain Consolidated, 20c.; Rescue, 15@20c.; Esperanza, 5c.

In oil shares business has been very steady, with a fair demand and very little change in prices. Home sold at $2.95; while Monte Cristo brought $1; Monarch, 57c.; Independent, 16c. There was some business in trust certificates of the Associated Oil Company at around 25c.

COAL TRADE REVIEW.

New York, July 2.

ANTHRACITE.

Though there is now no prospect of any serious labor troubles at the mines this year, and though warm weather has come again, the demand for anthracite continues active, and is taking all coal shipped from the collieries. Very little indeed has gone into storage at the great storage points in New Jersey and Pennsylvania since April 1, and it is hardly likely that any considerable amount will go into storage before August. Buying continues strongest in the East, though a heavy tonnage is going to upper lake points.

Nothing has been heard lately of the Hearst suit before the Interstate Commerce Commission, and in view of Judge Lacombe's comments on the plaintiff as a mere purchaser of coal, having no standing before the commission as a complainant regarding discriminating freight rates among the railroads, it is quite possible that there will be no appeal from Judge Lacombe's decision to the United States Supreme Court. However, it is not likely that the railroads have heard the last about the "Coal Trust," since Mr. Hearst is not averse to publishing his efforts as a philanthropist, and he will probably continue to keep his name before the readers of his newspapers.

Trade in Lake Superior territory might be better; receipts are not heavy and supplies accumulate slowly on the docks. In Chicago territory buying has been heavy. There was a rush of orders to get coal at June discounts, but irrespective of such buying, consumers are laying in supplies earlier than ever before, feeling that coal cannot be had for less later and insuring themselves against trouble should there be any interruptions of shipments.

Along the lower lakes and in Canadian territory buying is still good. In the line trade farther east and at points along the seaboard, though there is less urgency in the demand than a few weeks ago, business continues active and sales agents at New York have orders enough in hand to ensure a steady movement of coal during July.

Discounts were 10c. less on June 1, and the June prices for free-burning white ash coal, f.o.b. New York Harbor shipping port, are: Broken, $4.55; egg, stove and chestnut, $4.80. The better grades of steam coal continue to sell at about $3 for pea, and $2.50 for No. 1 buckwheat.

BITUMINOUS.

The seaboard bituminous trade is still quiet, but dealers who have been keen after anthracite are getting their pressing wants supplied, and are paying more attention to bituminous. Prospects therefore are for more activity in the trade before the end of this month, when, for instance, the shoal water ports will begin to lay in supplies for next winter. Car supply at the mines is not satisfactory, though in the prevailing condition of the trade shippers can keep going on what cars they get. Coastwise freight rates are weaker and may go lower, the supply of large craft being fully to demand if not exceeding it.

At points beyond Cape Cod conditions have changed little. A considerable tonnage is going forward to that territory, but orders received by shippers are mostly on contract business. Along Long Island Sound demand continues to pick up, and inquiries from that territory are more numerous. At New York Harbor points consumers continue to get coal as they need it, and though there is no especial activity in the trade, the volume of business is considerable. In the all-rail trade demand is slightly better than it has been.

Transportation from the mines to tidewater is fairly prompt. Car supply at the mines continues variable, but is not over 75 per cent of the demand. In the coastwise vessel market large craft are in good supply and rates tend downward. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, 80c.; Portsmouth and Bath, 85c.; Bangor, $1.10; Long Island Sound ports, 70c.

From New York Harbor rates are: Boston, Salem and Portland, 75c.; Providence, New Bedford and Long Island Sound, 65c.

Birmingham. June 29.

(*From Our Special Correspondent.*)

The production of Alabama coal continues heavy, with a good demand, as the production of pig iron is steady. Good prices prevail. The production is larger than it ever was, and should there be no stoppage of work after July 1 the production will exceed last year's. The present belief is that the miners and operators will adopt a new wage scale, and continue work without a day's stop. However, there may be a suspension for several weeks. The operators offered the miners an advance of 2½c. per ton for mining on the present scale. The miners demanded 5c., and in addition semi-monthly pay days and 8 hours for a day's work.

In the western part of Jefferson County, in Tuskaloosa County, in Blount and Bibb counties, as also Walker County, there is much developing going on, and more miners will be needed within the next 60 days than can be supplied. Two thousand men at least are now wanted at the mines in Alabama, and should there be no suspension of work after July 1 efforts will be made to bring miners from other States.

The coke production is increasing. The statement is made that the Woodward Iron Company is preparing to erect 300 more coke ovens at Woodward with which to supply its new furnace. The new ovens of the Empire Coal and Coke Company will not be ready for some little time yet on account of delays in receiving material. Good prices prevail for coke.

Chicago. June 29.

(*From Our Special Correspondent.*)

Heavy business in anthracite still characterizes the Chicago wholesale coal market. This is in part due, no doubt, to the approach of the end of the month, which is always, under the scale of 10c. advance each month, the time of heavy buying. The sale, however, has been extraordinarily large in the publication of reports of the possibility of another strike of the anthracite miners; the consumer and the retailer evidently do not wish to take any chances of another winter without anthracite. With the coming of July there may be a lull in the movement of anthracite, since there will remain but two months before the establishment of autumn prices; but many dealers expect to see the demand for anthracite continued heavy for another month at least. Egg size anthracite continues scarce and much in demand.

The market for bituminous continues light. Smokeless is $3.40@$3.50 for Pocahontas, New River and Maryland; Hocking brings the same price, and is in perhaps the best demand of the bituminous grades. The sale of Hocking in the Chicago market is in a comparatively stable condition. Youghiogheny is selling somewhat better than last week, and brings in the neighborhood of $3.75. For the first time in many months the supply of smithing coal seems to have caught up with the demand; and is quited at $3.50@$4. Indiana and Illinois is in fair demand at about $2 for lump and $1.75 for run of mine, of good quality. The policy of restricting the output of Western mines is already having a good effect upon local trade, causing a firmer tone to the market, with no apprehension of demoralization due to accumulation of cars upon track.

Cleveland. June 30.

(*From Our Special Correspondent.*)

The situation in the lake coal trade intrudes itself very forcibly upon the public attention just now. The movement to the lake ports is very heavy and the yards all along Lake Erie have been filled for a week. Vessels have not been available with which to move this material up the lakes, because the boats are being delayed so seriously at the head of the lakes that the vesselmen refuse to charter their tonnage for this trade. The movement thus far this season has been very heavy indeed, and the upper lake docks have had more coal carried to them than the railroads have had cars to move away. The result has been that the stock piles have been added to constantly, and are now congested to the point where little more coal can be received. There has been some talk of cutting down shipments, and this will have to be resorted to if the situation is to be relieved in the least. Prices have not changed, being $2.45 for Pittsburg and West Virginia lump and $2.35 for Ohio lump as a basis.

The coke situation might be improved. The furnaces in this territory have about all the coke they can use at once, but it is obtained with difficulty, the producers falling back into the diliatory habits of last year. The prices are about as they were, the best grades of furnace coke bringing about $3.25 at the oven. The domestic supply of coal has been adequate to all needs, and the shipments have been heavy. The dealers all along Lake Erie are laying in a large stock for future use and the factories have all they can care for.

Pittsburg. July 1.

(*From Our Special Correspondent.*)

Coal.—As indicated in last week's letter the Monongahela River Consolidated Coal and Coke Company succeeded in sending 10,000,000 bush. of coal to the lower ports on the rise. A large number of empty coal boats and barges were brought up before the waters receded. Rivermen were surprised to-day by another rise, and it is expected that from 3,000,000 to 4,000,000 bush. will get out. The railroad car service has been fair during the week, and large shipments have been made to the lake ports. The demand continues heavy and prices are firm.

Connellsville Coke.—The coke market is quiet, but prices are a trifle firmer than a week ago. Many of the large interests are stocking coke in anticipation of a shortage later in the year. Furnace coke is quoted at $3 at the ovens and foundry at $4@$4.50. The production, according to the last report of the *Courier*, for the previous week was 247,544 tons, a falling off of over 1,500 tons. The shipments aggregated 11,300 cars, distributed as follows: To Pittsburg and river tipples, 4,372 cars; to points west of Pittsburg, 5,400 cars; to points east of Connellsville, 1,528 cars. This was a gain of 84 cars, compared with the shipments of the previous week.

San Francisco. June 27.

(*From Our Special Correspondent.*)

Trade has been rather quiet and arrivals light. More coal is looked for from Australia shortly. Eastern coal is in rather light demand, and quotations are rather nominal.

Yard prices to dealers for Pacific Coast coals in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Rosslyn, $7; Seattle and Bryant, $6.50; Coos Bay, $5.50; white ash, $7. Rocky Mountain coal in car-load lots is quoted at $14 for Colorado anthracite, and $8.50 for Wyoming and Utah coal. Eastern coal is rather nominal, but quotations are $14, ex-ship, for Pennsylvania anthracite, and $13 for Cumberland. Foreign coal in cargo lots sells as follows: Welch anthracite, $13, nominal; cannel, $8.50; Brymbo and Wallsend, $7.50.

Foreign Coal Trade. July 2.

Exports of coal and coke from the United States for the five months ending May 31 are reported as follows by the Bureau of Statistics of the Treasury Department:

	1902.	1903.	Changes.
Anthracite	585,117	865,372	I. 280,255
Bituminous	2,210,416	2,048,650	D. 161,766
Total cost	2,795,533	2,914,022	I. 118,489
Coke	183,916	167,412	D. 16,504
Totals	2,979,449	3,081,434	I. 101,985

The increase this year was wholly in anthracite. The coke exports were chiefly to Mexico. The distribution of the coal exported was as follows:

	1902.	1903.	Changes.
Canada	1,903,107	2,193,459	I. 290,352
Mexico	234,633	317,499	I. 82,866
Cuba	207,309	185,391	D. 21,918
Other West Indies	150,857	94,881	D. 55,976
European countries	146,745	40,972	D. 105,773
Other countries	152,882	81,820	D. 71,062
Total	2,795,533	2,914,022	I. 118,469

The increase was wholly in exports to Canada and Mexico. The exports to Europe have fallen this year to a very small quantity. This is due to the fact that there has been no surplus to spare for foreign trade.

Imports of coal into the United States for the four months ending April 30, are reported as follows:

	1902.	1903.	Changes.
Canada	693,225	818,259	I. 125,034
Mexico	7,387	5	D. 7,382
Great Britain	40,878	1,190,120	I. 1,149,242
Other Europe	668	356	D. 312
Japan	8,176	5,314	D. 2,862
Australia	123,968	78,261	D. 45,707
Other countries	274	1,019	I. 745
Totals	874,576	2,093,334	I. 1,218,758

Of the coal imported from Great Britain this year 174,722 tons were classed as anthracite. All the rest of the coal imported was bituminous. The increases in imports this year was wholly at Atlantic ports. These imports are now nearly at an end, the receipts in May having been light.

Messrs. Hull, Blyth & Co., of Cardiff and London, report under date of June 20, that there is no change with regard to the Welsh coal market. For best Cardiff descriptions steams are still difficult to arrange for prompt loading. Smalls are a shade easier, otherwise prices remain firm. Quotations are: Best Welsh steam coal, $3.78@$3.84; seconds, $3.60; thirds, $3.54; dry coals, $3.24; best Monmouthshire, $3.42@$3.48; seconds, $3.36; best small steam coal, $2.22; seconds, $2.04; other sorts, $1.92.

The above prices for Cardiff coals are all f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days less 2½ per cent discount.

The freight market remains quiet but steady, and without any change in rates. Some rates quoted from Cardiff are: Marseilles, $1.45; Genoa, $1.50; Naples, $1.44; Singapore, $2.52; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.16; Santos, $2.76; Buenos Aires, $1.92.

IRON TRADE REVIEW.

New York, July 2.

The iron market continues to be essentially a waiting one, and the policy of buyers in holding back is beginning to have its effect. From all quarters we learn of concessions made, for the most part quietly, but none the less effectual. These, however, do not seem to stimulate buying, and business for the fourth quarter of the year is decidedly hanging fire. Such orders as are reported for pig iron are mainly in moderate sized lots for near-by delivery. Pig iron prices are showing the result of the concessions, and almost every one is looking for a further drop before bottom is reached. Steel billets are also lower, and have sold down to $29, Pittsburg. It may be said, however ,that there is no surplus of billets, and that it would be difficult to place any large orders.

The only lines in which animation has been shown during the past week are pipes and tubes, for which there is a considerable demand, and tin-plates, for which premiums have been paid, owing to the demand usual at the canning season. Structural material is

very quiet, as builders hesitate to place orders until the labor troubles show some sign of settlement.

Production continues on a very large scale. It is quite possible, however, that there may be some trouble in the Southern furnaces, as the Alabama coal miners generally went out on July 1, pending the settlement of the wage scale. At present, however, it does not look as though this strike would be a prolonged one.

The practical superceding of Mr. Charles M. Schwab as president of the United States Steel Corporation is not at all unexpected. Recent developments have tended to weaken public confidence in the head of the Steel Trust, and the managers of the company have no doubt recognized this fact. Mr. Schwab's successor, who at present has the nominal title of Assistant to the President, is Mr. William E. Corey, who has been president of the Carnegie Steel Company. The official statement says that Mr. Schwab's retirement from active work is due to continued ill health.

Birmingham. June 29.

(From Our Special Correspondent.)

There is quietness again in the pig iron market here, and indications point to another wait by the consumers, though furnacemen say there are no reasons for further reductions in quotations. A few sales are made in small lots. The manufacturers have been discussing prices and market conditions with the coal miners, pending the making of a wage contract for the year, commencing July 1. The statements were made in open session that the iron market is quiet with indications of a decline. At the same time the miners were offered an advance of 2½c. per ton on both the maximum and the minimum mining scale with No. 2 foundry iron at $12 per ton as the basis.

There is some accumulation of iron in the furnace yards, perhaps 100,000 tons in all. The larger consumers appear to be inquiring but not buying much, and the smaller consumers are buying in very small lots, so shipments do not equal production.

The following iron quotations still rule: No. 1 foundry, $15.50; No. 2 foundry, $15; No. 3 foundry, $14.50; No. 4 foundry, $14; gray forge, $13.50 @$14; No. 1 soft, $15.50; No. 2 soft, $15.

The rolling mills are shutting down for repairs and the usual summer rest. There will be little work at the mills until after July 5, or possibly July 15. Good prices prevail for finished iron and steel, it is announced, but the demand is not heavy.

There is a good demand for steel rails, the plant at Ensley working on full time. It is said the Tennessee Coal, Iron and Railroad Company has orders ahead for large amounts. Inquiries are said to have been received for deliveries during the next six months, and the company quoted $30 per ton, $2 in advance of the Northern mills. The Southern Pacific Railroad is said to have made inquiry, and also to have placed an order.

Foundries and machine shops are doing well, considering the season of the year. The foundrymen expect a reduction in iron quotations in the near future, and are buying from hand to mouth.

BY TELEGRAPH.

(From Our Special Correspondent.)

Birmingham, Ala., July 1.—The United Mine Workers of America have, up to date, failed to close contract with the operators. All work is suspended to-day by members of the union, 13,000 altogether. This will stop about three-fourths of the coal production in the State. Most furnaces, however, have a good supply of coal and coke on hand.

Chicago. June 29.

(From Our Special Correspondent.)

There is practically no change in the pig iron market, from the depressed condition noted last week. The few sales that have occurred have been of small quantities and for speedy delivery. Some agents report a slight lifting of the clouds in the shape of more inquiries for iron, but admit that there is nothing assuring in the situation; apparently the depression must last indefinitely. One significant feature of the present condition of things is a general tightening of credits by the sellers of iron and a careful watching for the slightest signs of a relaxation of general business prosperity.

Prices continue the same as last week: $18.35@$19.35 for No. 2 Southern or Northern, the higher price representing nominal quotations and the lower the minimum believed to have been made on the largest sales. Coke is abundant at $6@$6.50 on contracts, and $5@$5.50 for spot business.

Cleveland. June 30.

(From Our Special Correspondent.)

Iron Ore.—The lake situation is complicated and the demand for tonnage has increased through the delays that have unavoidably come to the boats. These delays have been occasioned by the shortage of cars at the lower lake ports, and the crowded condition of the coal docks making the movement of the boats very slow. Ore is collecting rapidly at the head of the lakes and shippers need tonnage. The market is strong with the rates inclined upward, but without a change. The rates of carriage therefore are: 80c. from Duluth; 70c. from Marquette, and 60c. from Escanaba. Ore prices hold firm at $4.50 for bessemer old range and $4 for bessemer Mesabi.

Pig Iron.—The buying of foundry has been confined to single car-loads and to 100-ton lots for immediate use. No contracts of any importance have appeared for the second half. The Southern furnaces have tried to sell material in this territory at $15, Birmingham, but have been undersold by the non-association furnaces of the South. The price obtained by these outside furnaces is said to have been $14.50, Birmingham. This brings the Northern prices down to about $19 or $19.50, Valley furnace for No. 2. Nothing has been done to establish such a price, however. The bessemer trade has been dull. Some inquiries have appeared for fourth quarter material, but no sales have been made. The old price remains unchanged, varying from $18.50 to $19.35 in the Valley. Basic producers are off the market for the time being. They are trying to get caught up on old contracts. No material has been sold, as most of the product for the third quarter has been placed under contract and consumers are not ready for fourth quarter business. The price remains unchanged at $18.75, Valley, for second half material. Production along all lines has been heavy and the shipments equal. The coke supply is all that could be desired, if the shipments are urged persistently.

Finished Material.—Specifications against former contracts on structural steel have been heavier during the past week. New orders have also appeared, and the market has had a better tone generally. The demand, however, has not necessitated a change in the schedule of possible deliveries, which are still offered anywhere from two weeks to three months, the time being according to the material demanded. Small angles and large beams are more easily obtained than any other sizes. The jobbers are getting a little business at 2.15@2.25c., out of stock. Association prices remain unchanged at 1.60c., Pittsburg. Plates are also in demand, and the specifications have been so heavy that deliveries on new contracts are now limited to three or four weeks. The small mills, however, are not crowded with premium business. Their market ranges from 1.80c. to 2c., Cleveland, while the Association price is 1.60c., Pittsburg. Small-sized plates are especially scarce. The sheet trade has been a little more brisk during the past week, and the market firm. Prices have not changed, nor has there been any tendency whatever to bring about a change. The prices are based on a quotation of 3.05c. for No. 27 black sheets out of stock, and 2.75c. for the same gauge in car-load lots at mill. The stock quotation on the same gauge of galvanized sheets is 4c. There has been a little better demand for steel rails, and the inquiries for 1904 material have been strong. In this territory they mostly come from the electric lines, which show a large degree of anticipated development quite equal to the steam railroads. The price does not change from $28, Pittsburg, for standard sections. The call for billets has been strong and the market lively. Considerable selling has been talked of for the latter part of this week. This may possibly bring about a change of the price, as the present quotation of $30@$31 is high.

Philadelphia. July 1.

(From Our Special Correspondent.)

Pig Iron.—General weakness prevails in the pig iron market. It is impossible to give actual quotations. The reason is some people are very anxious to sell, and they are likely to yield a point to effect a sale. The peculiarity of the pig iron market in this section is that consumers who have been in the habit of ordering from 100 to 1,000 tons of iron are now ordering car-load lots. Pig iron makers are more anxious to push iron on the market, and this is contributing to a very unsteady feeling. Quotations might be given generally at $20@$20.50 for No. 1; $18.75@$19.25 for No. 2; $18 for No. 2 plain; $18 for gray forge and $18.50 for basic. Gray forge has sold down to $17.50, and foundry irons have also sold under the figures quoted.

Billets.—The same hesitancy prevails in the ordering of billets. A good deal of business should be done and would be done if there were confidence. The prices quoted are about $30 at mill, but buyers are not caring to order much even at this attractive figure.

Merchant Bar.—Refined iron is quoted at 1.75c. at mill, with occasional concessions, and 1.65c. for steel bars. Makers are very anxious for business, and they will not be ready to start up very soon after repairs are made. Bar iron is accumulating at a number of mills, and this is having a disturbing influence.

Sheets.—The sheet manufacturers have had a very good second quarter, and are entering the third quarter with the general situation in their favor. So far as quick deliveries are concerned they are getting good prices, but the majority of buyers are not ordering for forward delivery.

Merchant Steel.—The demand keeps up in a retail way, and in the aggregate a big June business has been done. The consumption of merchant steel is satisfactory, and the weakening tendencies manifest themselves less in this branch than in some others.

Plates.—So far as the small business is concerned there is no change in prices. It is known among those on the inside that where large orders are submitted inviting concessions are quietly extended. For ¼-in. and universals 1.80c. is the price. Flange is strong at 1.90c.; marine, 2c.; fire-box, 2.10@2.20c.

Scrap.—Our people say that while there is not much demand for scrap at present there is no occasion for uneasiness as to the summer and autumn demand. They are picking up all the good scrap they can get and bargaining for a good deal more.

Pittsburg. June 30.

(From Our Special Correspondent.)

There is but little change in the iron and steel markets so far as buying for extended future delivery is concerned. Prices of pig iron are somewhat lower than a week ago, but sales are confined to a few small lots for early shipment. No buying has yet been done for fourth quarter, and but few inquiries have been received. Foundry iron and even gray forge continue to be quoted at about the price asked for bessemer iron. Foundries are not ready to buy for the next quarter and will not make any contracts until labor troubles are over. A strike of machinists and iron molders will likely be started this week, and it is difficult to predict how long it will continue.

The strongest lines this week are tin-plate and merchant pipe. A premium of 20c. a box over the official price of $3.80 a box is readily paid for tin-plate, and all new business for delivery during the next two months is going to the independent mills. The American Tin-Plate Company is sold up to September 1, and is not accepting any orders. For the first time in over a year it has been operating all of its mills, 233 in number. A fire on Saturday night at the big 30-mill Shenango plant at New Castle destroyed 10 hot mills and damaged the cold mills. Repairs cannot be made for several weeks. In the meantime the 20 remaining hot mills will be operated and the cold rolling will be done at the Greer plant in the same town, which will put its cold mills on double turn. The tin-house was not damaged, so that plates can be finished as usual. Of the independent tin-plate mills 58 are in operation and 22 are idle, on account of inability to get steel bars. The tin-plate combine has been greatly handicaped for tin-plate bars, owing to the pressure in the steel rail trade. The Youngstown plant had been taken off rails and put on bars, but had to be put back on rails again, on account of the urgency of orders. The canning season is the best in several years, and the demand for tin-plate is unprecedented. The pipe mills are unusually active, and the tonnage on the books is larger than a year ago. The mills have difficulty in making deliveries on old contracts and in a number of instances contracts for certain sizes have been rejected.

The scarcity of steel continues, and is keeping prices at a higher point than is warranted by the rates for finished products. A meeting of the leading steel interests was held here during the week, and the price of steel bars was reaffirmed at 1.60c. The mills are all busy, and the outlook is considered favorable. So far orders have been placed for steel rails for next year, aggregating over 500,000 tons, which, with the 400,000 tons that will go over from this year, makes a total of 900,000 tons or about one-third of the annual capacity of the mills. There is but little doing in structural material and new business is not expected until the labor troubles are settled. Building operations are seriously crippled by these unlooked-for disturbances. The trouble between the bricklayers' and the stonemasons' organizations, which was on for several weeks in this district tied up operations on several skyscrapers. Both sides during the week agreed to submit the differences to arbitration and pending a decision all men were ordered back to work. The arbitration board will meet here on July 13. Both sides named their committees yesterday, but there may be some difficulty in selecting an umpire. The most serious trouble threatened is that of the machinists and iron molders. The former made a demand for an advance of 15 per cent for the new wage scale to go into effect to-morrow and stipulated in the proposition that none but union men be employed in any of the machine shops. The manufacturers on Saturday made a proposition granting an advance of 5 per cent and refusing the clause as to the employment of non-union men. At a mass meeting on Sunday the machinists withdrew the objectionable clause and modified their demand for an advance fixing the desired increase at 10 per cent. The revised proposition will be submitted at a final conference with the manufacturers to-night, and if it is refused a general strike will be ordered. A compromise, however, is expected. There are about 5,000 machinists employed in this district outside of the Westinghouse interests, and of this number fully 3,000 are said to be union men. The iron molders made a demand for a minimum rate of $3.30 a day, an advance of 30c., over the existing rate.

A committee of the National Founders' Association held a conference on Friday night with a committee of the Iron Molders' Union, and offered a rate of $3.10 a day. This was refused and a general meeting of molders has been called for to-morrow night to consider the manufacturers' proposition. The leaders of the molders declare that the result of the meeting will be a vote to strike. Fully 2,000 molders will be involved.

Pig Iron.—The pig iron market is remarkably quiet, and but few sales are recorded. Bessemer is held at $19, Valley, for early shipment, and $18.65 for extended delivery. Foundry No. 2 is a trifle lower this week, being quoted at $19@$19.25, Pittsburg. Gray forge is quoted at $19, Pittsburg.

Steel.—Sales of bessemer and open-hearth billets during the past week amounted to from 10,000 to 15,000 tons. The price ranged from $28 to $29, delivered at Pittsburg. Steel bars and plates remain at 1.60c.

Sheets.—The market shows but little change. The demand is fairly good and prices are unchanged. The leading interests continues to quote No. 28 gauge black sheets at 2.75c., and galvanized, at 3.85c.

Ferro-manganese.—Domestic, 80 per cent, is still out of the market, and the foreign product is quoted at $50@$52.50.

St. Louis. June 30.

(*From Our Special Correspondent.*)

Pig Iron.—In spite of the near approach of the second half buyers are still out of the market. Large interests are still uncovered for the second half, and the fact that many concerns will not be operating for fully a month on account of flood damage postpones the necessity of buying at the present time.

Finished Material.—Jobbers and agents report a good business, especially in tubular goods. Prices are holding at combination figures, and no concessions except for large lots. Collections and shipments are both all that could be desired at this season. There has been a slight falling off in structural material purchased, due to the high cost and uncertainty of labor. The large office buildings and hotels under construction in the city are going up without interruption, however, but the amount of new building does not compare with the same season of last year.

New York. July 2.

Pig Iron.—The market is quiet. Buying is mostly confined to small orders. We quote for early delivery, Northern iron at tidewater: No. 1X foundry, $19.75; No. 2X, $18.75; No. 2 plain, $18.25. For Southern iron on dock, New York: No. 1 foundry, $19.25; No. 2, $18.50; No. 3, $18.25.

Bar Iron and Steel.—We quote for large lots on dock: Refined bars, 1.80@1.90c.; soft steel bars, 1.78@1.90c.

Plates.—Labor troubles still bother builders and others, and demand is not likely to improve till the situation has changed for the better. Sheared plates are quoted: Tank, ¼-in. and heavier, at 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Steel Rails.—The quotation remains $28 for standard sections, f.o.b. mills for 1903 delivery; light rails, $33@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections.

Structural Material.—Local buying is light, owing to the labor situation. We quote for large lots at tidewater: Beams, angles, channels and tees, 1.75@2c.

CHEMICALS AND MINERALS.

(See also prices-Current, page 40.)

New York, July 1.

While awaiting a revival from the midsummer quiet, it will be interesting, if not instructive, to review the business done in the past half year. Immediately we find a lower range of prices, not noly for most manufactured articles, but also for such important raw materials as brimstone and nitrate of soda, which are controlled by combinations. In some instances, however, the increased consumption has been beneficial, but on the whole, profits have been pared down considerably. On the other hand, some encouragement may be found in the continued growth of our chemical industry, which is assisted by cheap electric power and improved methods of manufacture. Then again more attention is being paid to the recovery of by-products that have heretofore been considered waste, notwithstanding their utilization at a good profit in Germany and Great Britain.

To show that America is gradually becoming independent of foreign countries as regards its consumption of chemicals and minerals, we give below the imports into the United States for May and the five months this year, in pounds, unless otherwise specified. Most of these imports show a marked falling off as compared with last year. The heaviest loser has been Great Britain.

	May.	Jan.-May.
Chlorate of potash	2,545	193,568
Muriate of potash	6,940,776	39,470,500
Saltpeter	2,120,365	6,445,871
All other potash	2,719,394	22,758,346
Caustic soda	266,976	1,248,423
Sal soda	236,800	1,507,283
Soda ash	1,294,106	9,490,212
All other nitrate of soda	1,013,807	8,168,548
Asphalt (tons)	13,513	44,017
Cement	86,813,572	393,689,023
Graphite (tons)	2,346	8,458
Salt	18,599,974	115,907,919

These importations were principally from Great Britain and Germany.

Cyanide of Potassium.—Deliveries are regular on contract, while spot business can be done at 20c. per lb., f.o.b. New York. New orders, however, are too few to influence the market either way, and there is no doubt sellers would be willing to shade quotations if the order were large enough. Judging from deliveries already made the American consumption will show an increase this year, as the treatment of low-grade ores in the West is enormous.

Bleaching Powder.—Judging from the statistical position in America, British manufacturers are getting the better of their Continental competitors. Notwithstanding a decrease of fully 7 per cent in the American consumption of foreign bleach, the imports of British brands have increased over 17 per cent, which is suggestive. The total imports into the United States in the five months ending May 31 amounted to 50,347,383 lbs., of which 39,933,152 lbs., or 79.3 per cent came from Great Britain. In the corresponding period last year the total imports were 54,317,366 lbs., of which 34,022,912 lbs., or 62.6 per cent was British bleach. In other words, the British trade has increased 5,910,240 lbs., or 17.4 per cent, while imports of other brands have decreased 9,880,423 lbs., or 48.6 per cent. The imports from all countries this year had an approximate chlorine content of 17,621,584 lbs., which compares with 19,011,078 lbs., in the same five months last year; showing a falling off of 1,389,494 lbs., or about 7 per cent. It should also be stated that we re-exported 180,340 lbs. of foreign bleach this year, as against 112,471 lbs. in 1902; an increase of 67,869 lbs., or over 60 per cent. The American consumption of foreign bleach averages about 10,033,000 lbs. monthly, which is 808,000 lbs., or 7.5 per cent less than last year.

This, of course, is only part of the supply, as the domestic works are manufacturing larger quantities than heretofore. Momentarily prices are nominal, as deliveries are being made on low-priced contracts taken some time ago. Prime foreign bleach is quoted at $1@$1.12½ per 100 lbs., f.o.b. New York, while domestic is offered at 75c.@$1 per 100 lbs., f.o.b. wroks.

Copper Sulphate.—Apparently nobody is doing any business, either for domestic or foreign consumption, and in the absence of orders prices continue unsteady. Wholesale buyers would probably find little trouble to purchase at $4.25@$4.50 per 100 lbs., f.o.b. New York. A discouraging feature of the situation is the heavy falling off in export trade, amounting to 44.7 per cent in the five months ending May 31. During that period the exports totaled 6,935 long tons, having an average invoice value of $91.98 per ton, which compares with 12,539 tons, valued at $89.77, in the corresponding period last year. It is interesting to state that while the average value of our exports has increased $2.21 per ton, those for Great Britain, whose trade has improved, have fallen $3.07. On the other hand, the difference between American and British prices is considerably smaller than last year. The principal consumers of American copper sulphate are the agriculturists in Austria, Italy and Argentina.

Acids.—Quiet, and prices unchanged.

We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°....	$1.50	Oxalic, Com'l..	$5.25@$5.50
Muriatic, 20°....	1.60	Sulphuric, 50°,	
Muriatic, 22°....	1.75	bulk, ton ...	13.50@14.50
Nitric, 36°.....	4.37½	Sulphuric, 60°..	1.05
Nitric, 38°.....	4.75	Sulphuric, 60°,	
Nitric, 40°.....	5.00	bulk, ton ...	18.00@20.00
Nitric, 42°.....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton ...	21.00@23.00

Brimstone.—Where to find new orders and what to charge seems more important than attending to regular contracts upon which deliveries are comparatively few. Importers have no spot goods, but second hands are willing to sell best unmixed seconds at $22.25 per ton. Shipments may be booked at $22@$22.25 for seconds, and about $1 less for thirds. In May the United States imported 11,198 tons crude brimstone, making 85,471 tons since January, which compares with 79,604 tons in the corresponding period last year; showing a decrease of 5,877 tons.

Exports of brimstone from Sicily in May amounted to 31,750 long tons, making 238,843 tons since January, which compares with 231,615 tons in the corresponding five months last year; showing an increase of 7,228 tons. The shipments to the United States from January to May, inclusive, were 51,413 tons best unmixed seconds, and 15,421 tons best thirds, making a total of 66,834 tons, equivalent to about 28 per cent of the aggregate Sicilian exports, and showing a decrease of 9,383 tons as compared with 1902.

Stocks of brimstone at Sicilian seaports on May 31 amounted to 289,205 long tons, which is more than was held on the same date for years past, though it is the second smallest quantity reported in the present year.

Pyrites.—Business is satisfactory, considering the quiet season in other lines of trade. Imports into the United States in May were 33,721 long tons, principally Spanish pyrites, which contained approximately 15,849 tons sulphur. For the five months this year the imports amounted to 174,650 tons, having an average value of $3.75 per ton, and showing an increase as compared with last year of 4,626 tons in quantity, and 23c. per ton in value. The sulphur content of this year's imports was approximately 82,085 tons, having an average estimate value of $7.98 per ton; showing an increase of 2,174 tons and 49c. per ton over 1902.

We quote: Domestic pyrites, $5 per ton for lump ore, f.o.b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Consumers are holding for lower prices, but the delay in arrivals has forced some of them to make inquiries for spot and nearby supplies, which importers quote at $2.05 per 100 lbs. Futures are still quoted at $1.95@$2, according to position.

Sulphate of Ammonia.—Sellers are firm in their views, asking $3.15@$3.17½ per 100 lbs. for good gas liquor, f.o.b. New York, but consumers are indifferent, expecting lower prices. Preparations are being made by the Semet-Solvay Company at Ensley, Ala., to make its product direct, instead of sending the raw material to Syracuse, N. Y. This is one of the largest manufacturers of sulphate of ammonia from by-product coke oven gas in the country.

Phosphates.—Exporters are doing better, both as regards quantity and prices. European superphosphate manufacturers are beginning to realize the uselessness of delaying their orders in expectation of lower prices. Consequently miners, particularly in Florida and Tennessee, are feeling more confident of the future, and, surveying the market, we believe, prices will be further advanced. There is no reason why miners should not receive more for their phosphates, particularly for high-grade rock, the supply of which, according to authoritative calculation, is limited. On the other hand, exporters are chartering vessels more freely, and the latest bookings have been on the basis of 14s. 9d. ($3.54) from Tampa, Fla., to France. In the five months ending May 31 the exports of Florida, Tennessee and South Carolina phosphates amounted to 307,182 long tons, which is 23,879 tons, or about 9 per cent more than was reported last year. These exports have been made chiefly to Germany, and were largely high-grade rock and land pebble phosphates. Simultaneously the imports into the United States have increased, and in the five months ending May 31 were 59,694 tons.

Rumors of further phosphate land sales are current, this time in Tennessee, where it is said Emory J. Smith has bought out the Sumner Phosphate Company, in Sumner County. Momentarily attention has been distracted from Florida, where the recent large transactions have caused universal comment, and lead to the belief that the time is not far distant when the high-grade rock and land pebble interests will be controlled by comparatively few people. In South Carolina, the Southern fertilizer combination—the Virginia-Carolina Chemical Company—is already master of the situation. In all quarters mining is active, though labor at times is scarce. What is more encouraging is the limited stocks on hand, owing to the heavy export movement and domestic consumption.

Abroad phosphate mining is also progressing. In April Bone, Algeria, shipped 32,655 metric tons—the largest quantity this year—making 96,820 tons in the four months. The leading shipper was the Constantine Company, and the principal consumers, Germany, France and Great Britain.

Phosphates	Per ton F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%).	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)..	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn., (78@82%) export .	4.00@ 4.25	6½@7d.	10.40@11.20
†Tenn., 78% domestic	3.75@ 4.00	.....	.....
†Tenn., 75% domestic	3.50	.....	.....
†Tenn., 73@74% domestic .	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic..	2.75@ 2.95	.....	.....
‡So. Car. land rock.....	....@ 3.25	.....	.....
‡S. Car. riv. r'k (55@66%)	2.75@ 3.00	5¼@5⅝d.	5.95@ 6.53
Algerian (63@70%)	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl (80@85%).....	.....	7¼@7¾d.	12.04@12.87

* Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
† Mt. Pleasant. ‡ On vessels, Ashley River.

Liverpool. June 17.

(*Special Report of Joseph P. Brunner & Co.*)

The exports of bleaching materials and sodas for May, as taken from Board of Trade returns, were:

Bleaching materials to the United States, 68,134 cwts.; other countries, 25,563 cwts.; total, 93,697 cwts. Soda ash, 103,305 cwts.; caustic soda, 127,113; bicarbonate soda, 28,237; soda crystals, 19,195; saltcake, 90,765; other sorts, 25,880; total, 394,495 cwts.

As compared with last year the shipments of bleaching materials are heavier to the United States, with a slight falling off to other quarters. In sodas, the exports are 300 tons, or about 1½ per cent, less than last year.

Caustic Soda is quiet, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for the Continent and a few other export quarters.

Bleaching Powder continues very slow, and prices are nominal at £3 5s.@£4 per ton for hardwood packages.

Sulphate of Ammonia is firmer at £13@£13 5s. per ton, less 2½ per cent for good gray 24@25 per cent, in double bags, f.o.b. here.

Nitrate of Soda is firm on spot at £9 12s. 6d.@£9 17s. 6d. per ton, less 2½ per cent for double bags, f.o.b. here, as to quality.

METAL MARKET.

New York, July 2.

Gold and Silver Exports and Imports.

At all United States Ports in May and Year.

Metal	May. 1902.	May. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports....	$1,968,407	$14,488,268	$19,884,712	$18,819,895
Imports....	1,497,053	1,462,845	9,100,887	10,600,646
Excess.	E. $471,354	E. $13,025,423	E. $10,783,825	E. $8,219,249
Silver:				
Exports ...	$3,785,305	$2,143,412	$19,277,968	$15,875,563
Imports....	1,946,811	1,613,183	10,417,885	8,289,993
Excess.	E. $1,838,494	E. $535,229	E. $8,860,083	E. $7,585,57

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending July 1, and for years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week ...	$1,529,698	$194 155	$455 520	$70 281	E. $1,780,780
1903.....	21,159 080	3,5 6 035	9,4 7,948	1,107,751	E. 25,963,269
1902.....	16,504 807	1,726,216	13 804,555	670,575	E. 28,411 571
1901.....	24,989,291	1,425 972	17,2 1 515	1,977,054	E. 38,817,780

The gold exported this week went chiefly to Germany; the silver to London. The gold imports were principally from Havre and Colon and the silver from Vera Cruz and Colon. To the year's totals of gold and silver exports are added shipments too late for the preceeding week's report.

Financial Notes of the Week.

The speculative markets have shown a slight improvement. General business still continues to be affected by labor troubles, but, upon the whole, is in very fair condition. No gold exports are reported this week, exchange being steadier after the heavy shipments reported last week.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending June 27, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts .	$892,381,300	$893,871,800	$913,746,900
Deposits	971,382,000	955,829,400	903,719,800
Circulation	30,535,800	31,456,000	44,088,600
Specie	172,311,600	173,634,500	163,770,200
Legal tenders	79,018,100	78,301,200	75,083,600
Total reserve	$251,329,700	$251,935,700	$238,853,800
Legal requirements ..	242,845,500	238,957,350	225,929,950
Balance surplus ...	$8,484,200	$12,978,350	$12,923,850

Changes for the week, this year, were increases of $8,925,800 in loans and discounts, $13,940,500 in deposits, $79,800 in circulation, $5,310,500 in specie, $998,900 in legal tenders, and $2,824,275 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd.	$173,634,500	.....	$163,770,200	.....
England ...	188,884,880	.....	188,542,915	.....
France	514,036,990	$223,898,395	502,600,800	$225,304,900
Germany ...	202,090,000	74,745,000	180,925,000	63,570,000
Spain	70,765,000	95,895,000	72,770,000	103,165,000
Neth'l'ds ..	23,836,500	34,077,500	19,701,500	33,221,000
Belgium	16,220,000	8,110,000	15,466,665	7,733,335
Italy	80,775,000	10,505,500	91,885,000	11,234,000
Russia	369,230,000	44,390,000	385,825,000	44,680,000

The returns of the Associated Banks of New York are of date June 27, and the others June 25, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

India buying has been rather weak, but French orders for 16,000 kgs. of silver have tended to strengthen the market, and to-day there are good inquiries at 24¼d.

The United States Assay Office in New York reports receipts of 31,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to June 18 are reported by Messrs. Pixley & Abell's circular, as follows:

	1902.	1903.	Changes.
India	£3,503,045	£3,157,025	D. £346,020
China	39,970	205,843	I. 165,873
The Straits	70,550	246,079	I. 175,529
Total	£3,613,565	£3,608,947	D. £4,618

Receipts for the week, this year, were £64,000 in bar silver, from New York, £2,000 from Chile,. £2,000 from the West Indies, £10,000 from New Zealand, and £8,000 from Australia; total, £86,000. Shipments were £13,500 in bar silver to Bombay, £40,000 to Singapore, and £22,612 to Hong Kong; total, £76,112.

Indian exchange has been firm, notwithstanding a comparative abundance of money in the Indian banks. The Council bills offered in London were all taken at 16d. per rupee. Buying of silver for Indian account in London is still comparatively quiet.

The coinage executed at the Mints of the United States in the fiscal year ending June 30, 1903, is reported by the Bureau of the Mint, Treasury Department, as below:

Denomination.	Pieces.	Value.
Double eagles	1,222,177	$24,443,540.00
Eagles	634,308	6,343,080.00
Half-eagles	2,845,589	14,227,945.00
Quarter-eagles	182,780	456,950.00
Dollars for La. Exp.....	250,258	250,258.00
Total gold	5,135,112	$45,721,773.00
Dollars	17,972,785	$17,972,785.00
Half-dollars	5,956,953	2,978,476.50
Quarter-dollars	10,840,785	2,710,196.25
Dimes	23,350,785	2,335,078.50
Total silver	58,121,308	$25,996,536.25
Five-cent nickels	31,786,725	$1,589,336.25
One-cent bronze	89,535,493	895,354.93
Total minor	121,322,218	$2,484,691.18
Total coinage	184,578,638	$74,203,000.43

In addition to the above there were coined for the Philippines 7,286,365 silver pesos; 1,101,595 silver 50-centavos; 501,232 silver 20c.; 1,001,542 silver 10c.; 2,651,000 minor 5c.; 3,541,020 minor 1c., and 3,100,020 minor ½c.; total, 19,182,824 pieces. For the Government of Venezuela, 500,000 5-Bolivars, 250,000 2-Bolivars; total, 750,000 pieces. For Colombia, 960,000 50-centavos, and 400,000 5c.; total, 1,360,000 pieces.

The foreign merchandise trade of France for the five months ending May 31 is reported by the Ministry of Commerce, as below:

	1902	1903.
Imports	Fr. 1,892,898,000	Fr. 2,004,809,000
Exports	1,751,071,000	1,746,086,000
Excess, imports	Fr. 141,827,000	Fr. 258,723,000

This shows an increase of 111,911,000 fr. in imports; a decrease of 4,985,000 fr. in exports; and a resulting increase of 116,896,000 fr. in the balance of imports.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	$0.41	$0.43
Peruvian soles and Chilean pesos	.39	.42
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	4.88
Twenty marks.....	4.76	4.80
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

June-July	Sterling Exchange	Silver— N. Y. Cts.	Copper— London, Pence.	Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.	Tin, Cts per lb.	Lead Cts. per lb.	Spelter— N. Y. Cts. per lb.	Spelter— S. L., Cts. per lb.
25	4.87½	52⅝	24¼	14 @14¼	13½ @13¾	57	28⅜	4.05 @4.10	5.65 @5.70	5.50 @5.55
26	4.87¼	52¾	24⅛	14 @14¼	13½ @13¾	57¼	28½	4.05 @4.10	5.65 @5.70	5.50 @5.55
27	4.87⅜	52⅞	24⅜	14 @14¼	13½ @13¾	....	28¼	4.05 @4. 0	5.65 @5. 0	5.50 @5.55
29	4.87⅜	52¾	24⅛	14 @14¼	13½ @13¾	57⅜	28½	4.05 @4.10	5.65 @5 70	5.50 @5.55
30	4.87¼	52⅝	24¼	14 @14¼	13¾ @13¾	58	28¾	4.05 @4.10	5.65 @5.70	5.50 @5.55
1	4.8715	52⅝	24¼	14 @14¼	13½ @13¾	57½	28⅛	4.05 @4.10	5.65 @5.70	5.50 @5.55

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures

Copper.—While the deadlock between buyers and sellers, which has existed for some time past, has apparently been broken, the volume of business transacted does not seem to have as yet assumed large proportions, as consumers over here remain very reluctant purchasers. The bulk of the business seems to have been done with Europe, where buyers had also waited until the last minute before covering their requirements. It is reported that the mines and smelters of the Amalgamated Copper Company in Montana have been shut down on account of labor troubles. If the struggle is a prolonged one, the curtailment in the production will be quite considerable. The ruling quotations at the close are given as 14@14¼c. for Lake; 13½@13¾c. for electrolytic in ingots, cakes and wirebars; 13¼@13½c. for cathodes; 13@13¼c. for casting copper.

The market for standard copper in London, which closed last week at £57 5s., opened on Monday at £57 7s. 6d., and the closing quotations on Wednesday are cabled as £57 10s.@£57 12s. 6d. for spot, £57@£57 2s. 6d. for three months.

Statistics for the second half of June show a decrease in the visible supplies of 300 tons.

Refined and manufactured sorts we quote: English tough, £61 10s.@£62; best selected, £62 10s.@£63; strong sheets, £70@£71; India sheets, £67@£68; yellow metal, 6¼@6⅜d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week of June 30, and for the year to date were, in long tons:

Exports:	Week.	Year.
Austria	80	2,927
Belgium	20	829
France	1,181	11,698
Germany	165	12,383
Holland	425	19,422
Italy	20	1,446
United Kingdom	603	8,462
Other countries	....	3,224
Total copper	2,494	60,391
Matte	....	211
Copper	102	12,802
Imports:		
Matte	....	984
Ore	3,010	8,844

Imports of copper into the United States, in all forms, with re-exports of foreign copper, are reported by the Bureau of Statistics of the Treasury Department as below, for the five months ending May 31; the figures being in long tons, of 2,240 lbs.:

Fine copper:	1902.	1903.	Changes.
Imports	11,937	23,962	I. 12,025
Re-exports	2,283	934	D. 1,349
Net imports	9,654	23,028	I. 13.374
Ores and matte:			
Imports	23.279	103.929	I. 80,650
Re-exports	6,712	3,386	D. 3,326
Net imports	16,567	100,543	I. 83,976

As ores and matte are not reported separately, it is not possible to give the fine copper contents closely. Estimating as closely as possible, however, we find that the total net imports of copper in all forms, this year, were equal, approximately, to 27,491 long tons of fine copper.

Of the fine copper imported this year 13,712 tons came from Mexico, and 3,625 tons from Great Britain. Of the imports of ores and matte, 88,974 tons came from Canada. A large part of this was British Columbia ore, shipped to the Northport and other smelters.

Exports of domestic copper, in all forms, from the United States are reported by the Bureau of Statistics as below, for the five months, the figures being in long tons:

	1902.	1903.	Changes.
Fine copper	77,434	56,959	D. 20,475
Ores and matte	10,693	5,402	D. 5,291

Again estimating the ores and matte, we find that the exports in all forms were approximately equal to 58,702 long tons of fine copper this year, against 81,882 tons last year; a decrease of 23,180 tons, or 28.3 per cent this year.

Tin has ruled quiet, but steady throughout the week, without any special feature. Consumption remains very good. The closing quotations are given as 28@28⅛c. for spot; 27½@27¾c. for futures.

The foreign market, which closed last week at £127 7s. 6d., opened on Monday at £127 10s., and the closing quotations on Wednesday are cabled as £127 10s. @£127 12s. 6d. for spot; £125@£125 2s. 6d. for three months.

Statistics for the month of June show a decrease in the visible supplies of 700 tons.

Imports of tin into the United States for the five months ending May 31 are reported as below, in long tons, of 2,240 lbs.:

	1902.	1903.	Changes.
Straits	9,514	10,191	I. 677
Australia	135	122	D. 13
Great Britain	5,797	6,741	I. 944
Holland	595	441	D. 154
Other countries	144	226	I. 82
Totals	16,185	17,721	I. 1,536

The tin received from Great Britain is chiefly Straits tin; that from Holland is Banka and Billiton tin. The increase this year was entirely in Straits tin, partly in that received direct, and partly in that received by way of British ports.

Lead has been very active, and a good inquiry is reported. There are rumors of an impending strike at several of the smelting works in Missouri. The closing quotations are 3.97½@4.02½c., St. Louis; 4.05 @4.10c., New York.

The foreign market continues active, the closing quotations being cabled as £11 15s.@£11 17s. 6d. for Spanish lead; £11 17s. 6d.@£12 for English lead.

Imports of lead into the United States, with re-exports of foreign lead, are reported as below by the Bureau of Statistics of the Treasury Department, for the five months ending May 31; the figures are in short tons, of 2,000 lbs.:

	1902.	1903.	Changes.
Lead, metallic	2,134	191	D. 1,943
Lead in ores and base bullion	45,172	40,087	D. 5,085
Total imports	47,306	40,278	D. 7,028
Re-exports	34,135	28,526	D. 5,609
Balance	13,171	11,752	D. 1,419

Of the imports this year 35,385 tons, or 87.8 per cent of the total were from Mexico, and 3,072 tons, or 7.6 per cent, from Canada. The balance over re-exports, shown above, is not consumed here, as a rule; most of it is retained in bond for future export. In addition to the re-exports given, there were 40 tons of domestic lead exported this year, against 1,430 tons last year.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is still dull at the decline. Missouri lead is selling at 4@4.02½c., according to brand and delivery; while desilverized brings 4.02½c.

The Merchants' Exchange reports receipts of lead for the week at 84,670 pigs. This is an unusual quantity, and represents shipments delayed by the floods. Shipments East for the week were 16,510 pigs, against 2,100 in the previous week.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of June 13: The price of silver during the week has been 13.25 reales per ounce. Exchange has gone down 4 centimos, making it 34.25 pesetas to £1. Local quotations for pig lead on wharf has been 63.25 reales per quintal, which, on current exchange is equal to £10 6s. 9d. per ton of 2,240 lbs., f.o.b. Cartagena. Exports for the week were 371,718 kgs. pig lead, 66,800 kgs. soft lead and 859 kgs. silver bars, all to Marseilles.

Spelter has been quiet, but steady, throughout the week, and nothing of interest has transpired. The ruling quotations are 5.50@5.55c., St. Louis; 5.65 @5.70c., New York.

The foreign market is steady, with spot rather scarce. Good ordinaries are quoted at £20 5s.; specials, £20 10s.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is steady and in good demand. Quotations are 5.50c. for both spot and July basis, East St. Louis.

Spelter receipts are reported by the Merchants' Exchange at 45,195 slabs. Like lead, this represents shipments delayed by the floods. Shipments East were 20,910 slabs, against 1,285 in the previous week.

Exports of spelter from the United States for the five months ending May 31 were 1,061 short tons, against 1,768 tons in the corresponding period in 1901; a decrease of 767 tons. Exports of zinc ore were 18,207 tons, against 19,453 tons last year; a decrease of 1,246 tons.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of June 13, that there is no change in the market. Shipments for the week were 215 tons of blende to Antwerp.

Antimony is dull. The ruling quotations are: Cookson's, 7½c.; Hallett's, 6⅝c.; Hungarian, French, Italian, United States and Japanese, 6⅜@6½c.

Imports of antimony into the United States for the five months ending May 31 are reported as follows, in pounds:

	1902.	1903		Changes.
Metal and regulus	2,056,047	2,764,787	I.	708,740
Antimony ores	224,135	1,724,442	I.	1,500,307

This shows very large increases this year, especially in ores.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Exports of nickel, nickel oxide and nickel matte from the United States for the five months ending May 31 were 907,448 lbs., against 1,244,513 lbs. in the corresponding period in 1901; a decrease of 337,065 lbs. this year.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Imports of platinum into the United States for the five months ending May 31 were 3,780 lbs., against 3,258 lbs. in the corresponding period of 1901; an increase of 522 lbs. this year.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders, and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Exports of quicksilver from all United States ports for the five months ending May 31 were 532,135 lbs., against 300,008 lbs, for the corresponding period in 1901; an increase of 232,127 lbs., or 77.4 per cent, this year.

Minor Metals and Alloys.—Wholesale prices, f.o.b. works, are as follows:

Aluminum.	Per lb.
No. 1 99% ingots	33@37c.
No. 2 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N. Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus foreign	45c.
Phosphorus American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. June 27.

(From Our Special Correspondent.)

With the ending of the first six months of the year 1903 a summary discloses the following: Shipment, 122,345 tons of zinc and 14,475 tons of lead; value of zinc, $4,170,790; of lead, $785,991; total value, $4,956,781. Last year: Shipment of zinc, 136,997 tons, and of lead, 16,051 tons; value of zinc, $3,873,933; of lead, $691,416; total value, $4,565,781. Increase in value, $391,432. Decrease in shipment, 13,662 tons of zinc and 1,576 tons of lead.

The increased value is doubtless due to the decreased output, so far as zinc is concerned, and the smaller output is due directly to the heavy spring and summer rains flooding the mines. Old mines go out and new mines come in every year, but this year the heavy water in the ground has retarded the final development of new mines, and at the same time it has weakened the outputting capacity of the old mines. A few new mines are now coming in, and the old mines are being unwatered. The output of the district for the past week bears testimony of this by a slight increase in the reserve stock. It will be necessary for the district to increase its output only an average of 300 tons per month to even up with last year's shipment, which decreased during the latter half of the year, as prices advanced.

The highest price paid for zinc this week was $40, and the assay basis was $35 to $37 per ton of 60 per cent zinc. Lead advanced $1, and closed the week again stronger at $51.50 per ton. A year ago zinc sold at $35 and lead at $46 per ton. The average price for zinc this year was $34 per ton, and lead $54.30, against $28.48 for zinc and $43 for lead the first half of last year.

Following are the shipments of zinc and lead from the various camps of the Joplin District for the week ending to-day:

	Zinc, lb.	Lead, lb.	Value.
Joplin	3,077,360	401,520	$67,270
Carterville-Webb City	1,689,490	361,970	38,887
Galena-Empire	1,176,200	105,670	21,722
Duenweg	796,320	207,700	21,478
Oronogo	544,600	7,740	10,021
Aurora	505,540	7,850	7,600
Carl Junction	402,150	.....	7,430
Spurgin-Spring City	225,010	80,520	5,673
Wentworth	319,800	.....	5,437
Granby	308,000	49,000	4,825
Prosperity	203,820	24,380	4,501
Zincite	129,960	4,480	2,584
Alba-Neck	137,350	.....	2,610
Carthage	.....	63,820	1,638
Cave Springs	34,400	9,720	849
Total sales	9,550,000	1,324,370	$202,525
Six months	244,690,280	28,950,810	$4,956,781

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.: for February, 4.861c.: for March, 5.174c.: for April, 5.375c.: for May, 5.469c.: for June, 5.537c.

Average Prices of Copper.

Month.	New York Electrolytic. 1903.	New York Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London Standard. 1903.	London Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.03
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11.628	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London. Pence.	1903. N. Y. Cents.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.
January	21.98	47.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.63
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
†American Cement	July 21	.30	$60,000	$620,000
American Cement, extra	July 21	.10	20,000	.....
*Annie Laurie, Utah	July 1	1.00	50,000	235,000
*Barreno, Mex.	July 15	.82	1,968	55,914
Camp Bird, Colo.	July 28	.15	123,000	568,100
†Dominion Coal, pf.	July 1	2.00	60,000	2,340,000
*Empire State, Idaho	July 15	.05	25,277	1,738,601
Gold King, Colo.	July 20	.03	28,105	459,056
*Los Dos Estrellas, Mex.	July 15	12.30	36,900	408,150
†Nova Scotia St. & Cl., pf.	July 15	2.00	20,600	185,400
†Phila. Nat. Gas, com.	Aug. 1	.75	231,406	3,185,425
§Temple Iron	July 1	3.00	7,200	21,600
Tenn. Copper	July 30	1.25	218,750	218,750
West Mountain, Utah	July 6	.04½	9,000	9,000

* Monthly. † Quarterly. § Semi-annual.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt
Alpha Con.	Nev.	27	June 30	July 21	.05
Annandale	Utah	..	June 15	July 8	.00½
Best & Belcher	Nev.	..	July 17	Aug. 7	.15
Bonanza Con.	Utah	..	July 6	July 23	.01
California	Utah	..	July 9	July 25	.001½
Caledonia	Nev.	54	July 8	July 24	.15
Christmas	Utah	..	July 14	Aug. 8	.00½
Con. New York	Nev.	18	July 15	Aug. 5	10
Elise	Utah	..	June 30	July 31	.00½
Emerald	Utah	..	June 15	July 8	.00½
Free Silver	Utah	..	July 10	Aug. 10	.00¼
Marina Marsicano	Cal.	..	Aug. 1	.....	.10
Middle Yuba	Cal.	..	July 27	.....	.01
Mohave	Utah	..	July 13	Aug. 3	.01
New Montezuma	Cal.	..	July 20	.....	.02
New York Bonanza	Utah	1	July 1	July 21	.03
Skylark Copper	Utah	..	June 22	July 7	.00½
Tetro	Utah	26	July 25	Aug. 22	.02
Utah Con.	Nev.	..	July 17	Aug. 7	10

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	June 24. H.	June 24. L.	June 25. H.	June 25. L.	June 26. H.	June 26. L.	June 27. H.	June 27. L.	June 29. H.	June 29. L.	June 30. H.	June 30. L.	Sales
Adams, Colo.	10	10												150
Amalgamated c., Mont	100	54¼	53⅛	54⅜	53⅜	54⅝	53¾	55⅞	54½	56¼	55	56¾	56	78,605
Anaconda c. Mont.	25	85⅛	85					86⅛	86	90	87	90	87½	2,650
Anaconda Gold, Colo.	5									16				200
Andes, Nev	1			.16	.15									300
Best & Belcher, Nev	3	2.25												200
Breece, Colo.	25					.25								50
Bullion, Nev.	1													
Caledonia, Nev	2½					1.60								100
Challar, Nev.	3					.30				.30	.29			500
Con. Cal. & Va., g. s. Nev	2½	1.65		1.75	1.65	1.65		1.60				1.65		1,300
Cons. Imperial, Colo.	1													
C. K. & N., Colo	1											.22		1,000
Cripple Creek c., Colo.	1					.05								500
El Paso, Colo.	1													
Elkton g., Colo.	1	.45				.45				.45		.46	.45	1,100
Golden Fleece, Colo.	1											.15		300
Greene Con., c., Mex.	10	20	19½	20	19¾	20	19¾	20½		22½	20¾	22½	21⅞	15,625
Goulds & Curry, Nev.	1			.44		.45								300
Homestake, S. Dak.	100													
Horn Silver, Utah	25													
Isabella, g., Colo.	1			.17				.16½		.17				1,700
Justice, Nev.	1	.13										.15		800
Leadville, Colo.	10													
Mexican, Nev.	3	1.20								1 30				300
Mollie Gibson, Colo.	5													
Moon-Anchor, Colo	5													
Occidental, Nev.	1	.32										.33		800
Ontario, Utah	100					5.75								20
Ophir, s., Nev	1			1.75		1.95				1 65		1.75		500
Overman, Nev.	1			.45	.44									300
Pharmacist, Colo.	1									03½				100
Portland, Colo	1			1.30				1 36	1.35	1.33				400
Potosi, Nev.	3			.33								.90		400
Silver Hill, Nev	1													100
Small Hopes, Colo.	20													
Sierra Nevada, Nev.	3											.11		200
Standard, Cal.	10	3 60												150
Tenn. c., Tenn	25	28⅛	28⅛	28⅜		29	28½	30	29	29⅛	29¼	30	29¼	2,925
Union Con., Nev.	2½			1.00						.50	.88			300
Union Cop., N. C.	10	1⅜		1⅜		1⅛						1⅛	1⅜	655
United Copper	100	18½	18⅜	18⅛	18⅜	18⅜	18½	18⅜		18½		18¼	18	1,900
Vindicator, Colo	1											85		500
White Knob. g. s., Ida	100									13	12½	14		700
Yellow Jacket. Nev.	3	84	83	79						69				500

Total sales 113,890 shares.

BOSTON, MASS.*

Name of Company.	par val	Shares listed.	June 24 H.	June 24 L.	June 25. H.	June 25. L.	June 26. H.	June 26. L.	June 29. H.	June 29. L.	June 29. H.	June 29. L.	June 30. H.	June 30. L.	Sales
Adventure Con., c.	$25	100,000	5⅛	5			5	5	5¼	5	5¼		5¼	5	820
Allouez	25	59,511	6				6	6	6⅛	6	6⅛	6⅛	6⅛		1,152
Amalgamated, c.	100	1,538,879	54¼	53⅞			54⅜	53¼	55¼	54½	56⅞	55	56⅜	56¼	16,144
Am. Gold Dredging	5	90,000													
Am. Z. L. & Sm.	25	60,000							9⅛						100
Anaconda	25	1,200,000									21⅞				10
Arcadian, c.	25	150,000	2¾						2⅞		2⅞	2½			470
Arnold	25	60,000													
Atlantic, c.	25	100,000					10	9⅞	15		10				495
Bingham Con., g. s.	50	150,000	27⅞				27⅞		28⅛	28	28⅜	28	28½	28	1,300
Bonanza	10	300,000					60		60						810
Cal. & Hecla, c.	25	100,000	450				440	430	430		455	435	465	455	84
Centennial, c.	25	80,000	19¾	19¼			19		19¼		20¾	19¾	20⅞	20½	2,430
Central Oil	25	60,250											7⅞		100
Con. Mercur, g.	5						1⅜								450
Copper Range Con.	100	285,000	54⅛	53¼			53⅜	53¼	54⅜	53⅞	55⅛	54⅛	56¼	55¼	4,568
Daly-West., g. s.	20	180,000	42				43	42½	42½		42½	41⅞	42⅜	42	435
Dominion Coal.	100	150,000	94	92			97½	95	97½	96	99	96	97	95	2,515
Dominion Coal, pf.	100	30,000					112								25
Dominion I & S.	100	100,000	17⅞	16¼			17⅜	16½	18	17⅜	18⅛	17	17⅜	16	5,060
Elm River.	12	100,000							3				3		210
Franklin, c.	25	100,000	8⅞				9				9		9¼	9	285
Granby	10	1,336,303	4⅝	4¼			4¼				4¼	4	4⅛		1,270
Guanajuato, Con.	5	385,000	1⅜				1⅜	1¼			1¼		1¼		1,555
Isle Royale Con., c.	25	385,000	7⅛	7⅛			7⅜		7¼	7⅛	7⅛		7⅛		529
Mass Con., c.	25	100,000	6⅜				6⅛	6	6⅜	6	6¼	6	6¼		525
Mayflower, c.	25	100,000											1¼		10
† Michigan, c.	25	100,000					7⅛	7⅛	8⅝				9⅛	8½	1,315
Mohawk, c.	25	100,000					44⅛		44½				45⅛	45	342
Mont. Coal & Coke	25	200,000													
Mont'l & Boston, c.	5	570,000					1¼		1¼				1⅛		495
New Idria	5	100,000											1⅛		
Nova Scotia St. & C.	100		94	92			98⅛	93					98⅛		273
Nova Scotia St. & C. pf	100														
Old Colony, c.	25	100,000							85				1		190
Old Dominion, c.	25	150,000	13½								13⅜	13⅛	13½		1,165
Osceola, c.	25	98,150	54¼				54⅜	54⅛			56⅛	55⅛	57		842
Parrot, s. c.	10	229,850	21⅜	21¼			22		22		22	21½	22	21⅝	2,042
Phoenix Con., c.	25	100,000							5		5		5¼	5	205
Quincy, c.	25	100,000	100				100		100		100		100		65
Rhode Island, c.	25	100,000	2						2						450
Santa Fe, g. c.	10	250,000	1½				1⅜						1⅜		960
Shannon, c.	10	188,153	11⅛				11⅛		11⅜		11⅛	11¼	11⅛		1,3 0
Tamarack, c.	25	60,000											117	116	40
Trimountain	25	100,000													
Trinity, c.	25	100,000	6¼	6			6	5½	5⅝	5½	6	5¾	6	5¾	2,341
United Copper	100	450,000													
United States, g.	25	419,000	21⅜				21¾	21½	22	21¾	22¾	22	22¾	22	4,380
U. S. Coal & Oil	25	240,000	12	11⅜			11⅛		12	11¾	12⅛	12	12⅛	12¼	2,325
Utah Con., g.	5	300,000	28¼				28⅞	28⅜	28¾		29¾	29	30	29¼	2,530
Victoria, c.	25	100,000	4⅜				4		4 7/16	4	4				595
Winona, c	25	100,000	9	8⅛			8¾	8¼	9		9⅛	9¼	9¼		1,025
Wolverine, c.	25	60,000	65⅛	65					65¾		66½	65¼	67	66¾	385
Wyandot	25	100,000													

* Boston Stock Exchange. † Ex Dividend. ‡ Assessment Paid. § Holiday. Total sales, 64,376 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	June 19. H.	June 19. L.	June 20. H	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	June 24. H.	June 24. L.	June 25. H.	June 25. L.	Sales.
Central Eureka	Cal.	$400,000							.91	.90					1,000
Colehan	Nev.	1,000,000	.27	.19	.24		.24	.21	24	.22					6,550
Draper	Cal.	500,000													
Esperanza	Nev.	1,000,000	.08	.06			.07		.06	.05	.05				16,700
Gipsy Queen	Nev.	750,000					.27	.26	2½		.28	.26	.28	.26	1,700
Gold Mtn., Con.	Nev.	750,000	.22	.21			.20		.21	.19	.20		.21	.20	7,800
Lucky Tom	Nev.	1,000,000							.15						5,000
MacNamara	Nev.	500,000	.20		.31	.29	.32				.30		.29		1,650
Mont. Tonopah	Nev	1,000,000			1.12½		1.12½						1.15		200
Paymaster	Nev.	750,000	.24	.23	.23								.23		2,000
Rescue	Nev.	500,000	.17	.16	.16				.16		.16	.15	.16		3,400
South Eureka	Cal.	300,000													
Tonopah-Belmont	Nev.	2,000,000	2.37½	2.35	2.37½		2.35		2.35	2.32½	2.33½	2.30	2.25		2,025
Tonopah Fraction	Nev.	750,000	1.05												500
Tonopah	Nev.	1,000,000			8.50	8.12½							8.12		600
Tonopah Midway	Nev.	1,000,000			.55	.49							.48		1,700
Tonopah North Star	Nev.	750,000	.48	.47	.50	.48					.49	.48	.48		3,300
Tonopah Union	Nev.	750,000					1.40		1.40		1.42½	1.40	1.40		700
United Tonopah	Nev.								.16				.10	.15	4,500
Utopia	Nev.	1,000,000	.57	.44									.57		1,000

* San Francisco & Tonopah Mining Exchange. Total sales, 58,225 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val	June 24. H.	June 24. L.	June 25. H.	June 25. L.	June 26. H.	June 26. L.	June 27. H.	June 27. L.	June 29. H.	June 29. L.	June 30. H.	June 30. L.	Sales
Allis-Chalmers, U. S.*	100	13¾	13¾											100
Allis-Chalm's, pf, U.S.	100													
Am. Agr. Chem., U.S.	100													
Am. Agr. Chem. pf, U.S.	100													
Am. Sm. & Ref., U.S.	100	44½	44½	43⅜	43⅛	44	44					45⅛	44⅜	5,010
Am. Sm. & Ref. pf, U.S.	100											92	91	835
Am. Steel & Fdy., U.S.	100													
Am. S. & Fdy. pf., U.S.	100			55¾	55									500
Col. Fuel & I., Colo.	100	69¾	67¾	69	68	66⅛	64¼	65⅝	64⅛			65½	64¾	39,130
Col. & H. C. & I., Colo.	100					17¾	17¾							250
† Crucible Steel, U. S.	100	15	15	15	14⅞	15	14⅞							505
† Crucible Steel, pf, U S	100	80½	80¼	80⅛	80¼	80½	80					80¼	80⅛	882
† Mong. R. Coal, Pa.	100			10¾	10⅝	10⅝	10⅝					10⅝		670
† Mong. R. Coal pf, Pa	100	40¾				40¼	40¼					40⅝	40⅜	458
National Lead, U.S.	100	16½	16⅛			16	16					16⅛	16⅛	800
National Lead pf, U.S.	100			83¾	83¼									130
† Phila Nat. Gas	100	41⅝	41½	41⅜	41⅜							41¾	41¾	2,245
† Phila Nat. Gas, pf	100	47	47											30
† Pittsburg Coal, Pa.	100	27⅛	27⅛											200
† Pittsburg Coal pf, Pa	100	86	86	86	85¾	86	86					86¾	86	663
Republic I & S., U.S.	100	14⅜	14⅜	14¾	13⅝	14⅛	13¾	14	13⅜			14¾	14	4,470
Republic I. & S., pf, U.S.	100	75	75	74¾	74	74⅝	74½					75	75	1,845
Sloss-Shef S. & I., Ala.	100	40	40			39¼	39¼					40	40	960
Sloss-Shef S. & I. pf, Ala.	100													
Standard Oil, U.S.	100	640	640	645	642	645	640¾					642		646
Tenn. C. I. & R. R., Ala.	100	52¼	50¾	51	51	50½	50¾	51	50⅜			53	53	8,500
U. S. Red & Ref., U. S.	100													
U. S. Red & R. pf., U.S.	100													
U.S. Steel Corp., U.S.	100	30¼	29⅝	30	29⅜	29¾	29⅜	30	29¼			31⅛	30⅛	111550
U.S. Steel Corp. pf, U.S.	100	80	79½	79¾	79⅜	79⅜	79¼	79⅝	79¼			80⅜	79¼	64,827
Va.-Car Chem., U.S.	100	53	53	53½	52½	54½	53	54½	54⅛			55½	53⅜	3,150
Va.-Car Chem. pf, U.S.	100											1 7	117	500
Va. I. C. & Coke, U. S.	100											28½	28⅛	100

* New York Stock Exchange. † Pittsburg Stock Exchange. ‡ Ex-Dividend. Total sales, 247,996 shares.

COLORADO SPRINGS, COLO.*

Name of Company.	Par val	June 20. H.	June 20. L.	June 22. H.	June 22. L.	June 23. H.	June 23. L.	June 24. H.	June 24. L.	June 25. H.	June 25. L.	June 26. H.	June 26. L.	Sales
Acacia	$1	.08¼	.08	.08	.07½	.08¾	.08	.08¼	.08	.08¾	.06	.08¾	.08	1,000
Am. Con.	1	.02¾	.02	.02¼	.02	.02½	.02	.02½		.02¼	.02	.02¼		
Anaconda	1	.14	.12	.14	.12	13¼	.12½	.13½	.12	.14	.12½	.14	.12½	1,000
Ben Hur	1	.02		.01¾		.01⅞		.02¼	.01⅞	.01¾				
Blue Bell	1	.06	.05	05		.05		06	.05	.06	.05	.06	.05	
C. C. & M.	1	.02¼	.02	.02		.02½		.02¼	.02	.02¼	.02	.02¼	.02¼	
C. K. & N.	1	.21¾	.21	.21		.21¾	.20¾	.21¾	.20⅞	.21¾	.21	.21¾	.20¾	26,600
C. C. Con.	1	.04		.04½		.04½		.04		.05	.04½	.04½		1,000
Coriolanus	1	.03		.03		.03		.03	.02½	.03	.02¾	.03		
Des Moines	1					.02¼		.03	.02½	.02½		.04	.02¾	1,000
Dr. Jack Pot	1	.09		.09		.09		.09	.07¼	.09	.08	.09	.08¾	6,400
Elkton Con.	1	43	.41	.41		.42	.41	.43	.41	.41		.41		1,655
El Paso	1	.60⅛	.60	.60¾	.60	.60¾	.60	.60¾	.60	.60¾	.60	.60¾	.60	8,400
Fannie Rawlings	1	.04	.03	.04	.03	.04	.03	.03¾	.03	.03¾		.03¾		
Findley	1	.14½	.13½	.14		.14		.14		.13½	.13¾	.14½	.13¾	2,500
Gold King	1													
Gold Dollar Con.	1	.05¼	.05	.05¼	.05	.05½	.05	.05	.04¼	.04⅞	.04¾	.04⅞	.04¾	10,000
Golden Cycle	1	.71	.70	.71	.66	.71	.66¾	.68¾	.66¾	.67½	.67⅝	.70	.66	2,000
Golden Fleece	1	.12		.12		.12	.06	.12	.06	.12		.12		
Gould	1	.03¼		.03¼	.02	.03½	.03	.03½	.02¾	.03¼	.02¾	.03½	.03	1,000
Hart	1	.03	.02½	05	.02¾	05	.02½	.05	.02½	.05	.02½	.05	.02½	
Isabella	1	.15¼	.14¾	.15½	14	.15¼	.14½	.15½	.14½	.15	.14¾	.15¼	.14¾	11,500
Jack Pot	1	.09		.09		.10		.09		.09		.09		
Last Dollar	1	.60		.52	.48	.51	.49	.51	.49	.51	.49	.51	.49	10,000
Lexington	1	.04½	.03¾	.04¼	.04	.04	.03⅝	.04½	.03¾	.04½	.04	.04½	.03¾	1,000
Little Puck	1	.02¾		.03	.02¾	.02¾	.02¼	.03	.02¼	.03	.02¼	.03		
Mollie Gibson	1	.06	.05½	.06	.05¾	.06	.05¾	.06	.05½	.06	.05¾	.06	.05½	1,000
Moon Anchor	1	.08½	.07½	.08½		.08¼	.08	.08¼	.08	.08½		.08½	.07½	
New Haven	1	.03	.02¾	.03	.02¾	.03	.02¾	.02¾	.02¾	.03	.02½	.03	.02¾	5,000
Pharmacist	1	.05	.03¾	.04½	.04	.04½	.03½	.04	.03¾	.04	.03¾	.04	.03¾	14,000
Pinnacle	1	.04¼		.04½		.04½		.04¼				.04¼		
Pointer	1	.02½		.02½	.009	.01		.01		.01½		.01		
Portland	1	1.26	1.23	1.30	1.23	1.26	1.23	1.30	1.23	1.32½	1.28	1.35	1.28	3,200
Prince Albert	1	.02½		.03	.02¼	.03	02	.03	.02	.03	.02	.03	.02	
Vindicator	1	.92		.90		.90		.91		.92		.92		100
Work	1	.05½		.06¾	.05¼	.06	.05¾	.06	.05¾	.06	.05½	.06¾	.05¼	5,000

*Colo. Springs Mining Stock Exchange. † Holiday. All mines are in Colorado. Total sales 112,755 shares.

COLORADO SPRINGS. (*By Telegraph.*)

Name of Company.	June 29. H.	June 29. L.	June 30. H.	June 30. L.	Name of Company.	June 29. H.	June 29. L.	June 30. H.	June 30. L.
Acacia	.08¾	.07½	.08¼	.08	Isabella	15¼	.14¾	15½	.14¾
Am. Con	.02½	.02	.02½	.02	Jack Pot	.09	.08	09	.08
Anaconda	.12⅞	12½	.12⅜	.12	Keystone	.06	03	.05	.03
Blue Bell	.06	.05	.06	.05	Last Dollar	.55	.49	.56	.49
Cripple Creek Con.	.05	.04⅜	.05	.04½	Lexington	.04¾	.03¾	.03¾	.03⅝
C. K. & N.	.21	.20¾	.21	.20⅝	Little Puck	.03	.02	.03	.02¼
Doctor Jack Pot.	.09	.08¾	.09	.08¾	Mollie Gibson	.06	.05½	.06	.05⅝
Elkton, Con.	.42½	.41	.43	.41	Moon Anchor	.09	.08	09	.08
El Paso	.61⅛	.60	.61½	.61	Old Gold	.07¼	.07	.07	.06¾
Findley	.14¼	.14	.14¾	.14	Pharmacist	.03¾	.03½	.03¾	.03⅝
Gold Dollar Con	.05	.04⅞	.05	.04¾	Pinnacle	.04¼	.03½	.04¼	.03½
Golden Cycle	.69	.68	.69	.68	Portland	1.30	1.26	1.32	1.27
Golden Fleece	.11	.05	.11	.05	Vindicator	91	.80	81	80
Gould	.03¼	.03	.03¼	.02¾	Work	.06	.05¾	.06¾	.05¼

SAN FRANCISCO (*By Telegraph*)

Name of Company.	June. 29.	June. 30.	Name of Company.	June. 29.	June. 30.
Belcher	.43	.48	Justice	.12	.13
Best & Belcher	3.00	2.60	Mexican	1.20	1.25
Caledonia	1.20	1.20	Occidental Con.	35	.34
Challenge Con	.56	.55	Ophir	1.65	1.65
Chollar	.25	.26	Overman	.38	.36
Confidence	1 25	1.25	Potosi	.27	.29
Con. Cal. & Va.	1.60	1.60	Savage	.19	.20
Con. Imperial	.06	.02	Sierra Nevada	.68	.71
Crown Point	.28	.28	Union Con.	.92	.95
Gould & Curry	.40	.41	Utah Con	28	.28
Hale & Norcross	.60	.67	Yellow Jacket	.75	.78

STOCK QUOTATIONS

MEXICO*. June 19.

Name of Company	Share Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango.				
Ca. Min. de Penoles	2,500	$50.00	$4,000	$4,500
San Andres de la Sierra	200		10,000	
Guanajuato.				
Angustias, Pozos	2,400	5.00	80	90
Cinco Senores y An., aviadoras	2,000	15.00	185	195
Cinco Senores y An., aviada	400	10.00	160	170
Providencia, San Juan de la Luz	6,000	2.00	135	150
Queensland y Australia	300		90	100
Guerrero.				
Delfina, 1st serie	2,500		45	40
Delfina, 2d serie	2,500		30	29
Garduno y Anexas	7,200		45	60
Hidalgo.				
Amistad y Concordia	9,600	6.90	80	82
Carmen, aviada	1,100		140	150
Guadalupe Fresnillo Mill	1,000		230	270
Guadalupe Fresnillo Mine	1,400		70	80
La Blanca, aviadora	1,536		1,000	1,200
La Blanca, aviada	768		8 25	840
La Reina y An., aviadora	5,600		21	22
Luz de Maravillas, aviadas	1,100		20	
Maravillas y An., aviador	1,680		90	110
Maravillas el Lobo	1,000		130	180
Palma y An., aviador	1,800			12
Real del Monte	2,554	10.00		
Refugio, avadia	12,800		7	5
Santa Ana y An., aviadora	1,800		30	40
Santa Ana y An., aviada	600		25	30
Sta. Gertrudis y An., aviadas	9,600		7	8
Sta. Gertrudis y An., aviadora	28,800	1 00	87	88
Santo Tomas Apostol aviadoras	5,100		3	6
San Felipe de Jesus, aviadora	3,600		18	20
San Felipe de Jesus, aviada	1,200			10
San Rafael y An., Trompillo	1,200	12.00	1,200	1,230
San Rafael y An., aviada	1,200	4 00	420	435
Soledad, aviada	960	0 .00	440	460
Sorpresa, aviada	960	5.00	330	350

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico.				
Alacran	$2,400		75	85
Aldebarran			85	90
Buen Despacho	3,000		82	83
Dos Estrellas	3,000	30.00	2,380	2,400
La Esperanza (El Oro)	3,000	10.00	1,300	1,330
La Reformia, aviadores	2,000		75	85
Providencia, pagadoras	1,800			
Providencia, liberadas	900			
Santa Ana, Esperanza	2,400		70	90
Michoacan.				
Luz de Borda, aviadora	3,000		90	100
Luz de Borda, aviada	1,000		23	26
Nuevo Leon:				
La Fraternal	1,000		600	550
Nonas de Bajan	1,000		700	800
Santiago y An., Tlal.	4,000			
San Luis Potosi.				
Concepcion y An.	3,000		100	105
El Barreno, aviadora	2,000	2.00	40	45
Sta. Maria de la Paz	2,400	20.00	680	700
San Diego y Annexas	2,400	4.00	25	28
Zacatecas.				
Asturiana y An.	2,500		55	85
Candelaria y Pinos	2,500	10.00	280	300
Cubiertas	2,400			
Esperanza y An.	2,400		58	65
Lourdes	2,500		50	60
Luz de Minillas, pagadoras	2,000		10	15
Nueva Quebradilla, aviadoras	2,400		40	45
Nueva Quebradilla, avaidas	600		45	40
San Carlos y Annexas	2,500	20.00	130	150
Sta. Maria de Gaud	2,500	10.00	70	75
Miscellaneous.				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	10,000	6.00		
La Luz Hac. (Pachuca)	3,750		280	290
La Reina (Chihuahua)	192			
Naica (Chihuahua)	100		11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,100
Natividad (Oaxaca) aviadas	600	4.00	1,000	1,100
San Francisco Hac.	6,000	1.00	53	55
Santa Ana Huantla Morelos	4,000			
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* June 27.

Name of Company	Shares.	Par Val	High	Low	Sales.
Ajax	300,000	$10	26	.25	3,400
Ben Butler	500,000	1	.12¾	.12¼	2,000
California	300,000	1	.17¼	.15½	15,900
Carisa	500,000	1	.11½	.10	11,150
Con. Mercur	1,000,000	5	1 46½	1.43	5,225
Comstock			.90	.83	490
Daly					
Daly-Judge	300,000	1	11.60	10.90	1,485
Daly-West	300,000	20	42.15	41 95	210
Grand Central	250,000	1	4 54	4.54	100
L Mammoth	150,000	1	.94½	.73½	31,700
M. Washington	300,000		.02½	.02½	2,000
Mammoth	400,000	25	1.05	1.05	100

Name of Company.	Shares.	Par Val	High	Low	Sales.
Majestic Cop					
May Day	400,000	0.25	.21	.19¼	21,900
N. Y. Bonanza			.21	.20	5,000
Petro					
Sacramento	1,000,000	5	.25	.24⅞	3,600
Silver Shield			.08	.08	1,000
South Swansea	300,000	1			
Star Con	500,000	1	.29⅛	.23	18,905
Uncle Sam	500,000	1	.24	.23	1,000
Utah	100,000	10			
Victor	500,000	1	.21	.16⅜	8,600
Wabash			.20	.18¾	1,500
Yankee Con	500,000	1	.37	.35	300

All mines are in Utah. *By our Special Correspondent. Total sales, 137,495 shares.

ST. LOUIS, MO. June 27.

Name.	Capital Stock	Par val	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$3,000,000	$10	$0.50	$0.75
Catherine Lead, Mo.	500,000	10	1.25	2.25
Central Coal & C.	1,875,000	100	63.25	65.00
Central C. & C., pf.	1,875,000	100	74.00	75.50
Central Lead, Mo.	1,000,000	10	100.00	125.00

Name.	Capital Stock.	Par val.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$500,000	10	$11.00	15.00
Con. Coal, Ill.	500,000	100	22.50	23.00
Doe Run Lead Co.	1,500,000	100	107.50	110.00
Granite Bimet, Mt.	1,000,000	10	60	.68
St. Joe Lead, Mo.	6,000,000	10	15.50	17.00

*From Our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Company.	par val	June 24. H.	June 24. L.	June 25. H.	June 25. L.	June 26. H.	June 26. L.	June 27. H.	June 27. L.	June 29. H.	June 29. L.	June 30. H.	June 30. L.	Sales
Am. Alkali, Mich	$50													
Am. Cement	10	8	8	8	8	8	8			8	7¾	8		668
Cambria Iron, Pa.	50			47	47					47		47		31
Cambria Steel, Pa.	50	23¾	22⅛	22¾	23¾	23¾	22½	22⅜	22⅝	23	22⅝	23⅝	23⅛	1,291
Penn. Steel, pfd.	100	88	88											25
Susq. I. & S., Pa.	5	1⅜	1¾	1¾	1¾	1⅞	1	1	1			1½		7,535
United Gas I., Pa.	50	83⅞	88⅛	88¾	88¾	88⅜	88¼	88¼	88¼	89½	88¾	89¼	88¾	2,362
Warwick I. & Steel	10													

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 12,112 shares.

LONDON. June 19.

Name and Country of Company	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date	Quotations. Buyers. £. s. d.	Quotations. Sellers. £. s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	Apr., 1903	4 12 6	4 17 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	4 6 3	4 8 9
Arizona, c., Def., ord	63,444	1 0 0	5 6	Feb., 1903	7 15 0	8 5 0
Arizona, pref., ord	316,360	1 0 0	5 6	Feb., 1903	8 0 0	8 5 0
Camp Bird, g., Colorado	738,000	1 0 0	0 7½	May, 1903	1 8 9	1 11 3
Central Chile, c., Chile	276,248	1 0 0			3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	6 10	May, 1903	1 17 6	2 2 6
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	Dec., 1902	1 13 9	1 16 3
Frontino & Bolivia, g., Colombia	128,682	1 0 0	3 0	July, 1901	13 9	16 3
Le Roi, g., British Col	200,000	5 0 0	5 0	Nov., 1899	1 2 6	1 5 0
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	1 5 0	1 7 6
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	2 6	3 6
Montana, g. s., Montana	657,128	1 0 0	6	April, 1899	1 9	2 3
Mountain, c., Cal.	250,000	5 0 0	4 0	Nov., 1902	3 2 6	3 7 6
Stratton's Independence, Colorado	1,000,007	1 0 0	6	April, 1902	7 6	8 6
St. John del Rey., g., Brazil	546,265	1 0 0	8	June, 1903	15 0	16 3
Utah Con., g. c., (Highland Boy), Utah	300,000	1 0 0	7 0	Jan., 1903	5 10 0	6 0 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	6 3	8 9
European:						
Linares, l., Spain	15,000	3 0 0	9	Oct., 1902	2 15 0	3 5 0
Mascot. & Barry, c., sul., Port'g'l	185,172	1 0 0	11 0	May, 1903	3 7 6	3 12 6
Rio Tinto, c., Spain	325,000	5 0 0	27 6	Apr., 1903	46 2 6	46 7 6
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	Apr., 1903	6 0 0	6 5 0
Tharsis, c., Spain	625,000	2 0 0	6 0	May, 1903	3 15 0	4 0 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	495,348	1 0 0	2 0	July, 1903	1 17 6	2 0 0
Briseis, Tin, Tasmania	600,000	1 0 0			4 6	5 6
Broken Hill Pr'p., s., N. S. Wales	960,000	8 0	1 0	Feb., 1903	1 9 0	1 10 0
Cosmopolitan Prop., W. Australia	385,000	1 0 0	6	July, 1902	18 0	19 0
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	9 11 3	9 13 9
Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Sept., 1902	7 13 9	7 16 3
Great Bo'd'r Pr'p., W. Australia	1,750,000	2 0	6	June, 1903	1 5 0	1 5 6
Ivanhoe Gold Corp. W. Australia	200,000	5 0 0	4 0	Jan., 1903	8 15 0	8 17 6
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	July, 1903	4 7 6	4 10 0
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 2 6	2 5 0
Mt. Lyell M. & R. I., c., Tasmania	275,000	3 0 0	1 0	July, 1903	2 17 6	3 6 0
*Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	May, 1903	3 6 3	3 7 6
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 2 6	5 5 0
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	4 6	May., 1903	7 5 0	7 7 6
Mysore Gold, Colar Fields	566,043	10 0	4 0	July, 1903	7 1 3	7 3 9
Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 10 0	2 12 6
Ooregum, g., Colar Fields	343,000	10 0	1 6	Apr., 1903	1 11 3	1 13 9
Oregum, pref., g., Colar Fields	240,000	10 0	1 6	Apr., 1903	2 0 0	2 2 6
African:						
Angelo, g, Transvaal	600,000	1 0 0	6 0	July, 1903	7 2 6	7 7 6
Bonanza, g., Transvaal	200,000	1 0 0	10 0	June, 1903	4 1 3	4 3 9
British South Africa	4,438,019	1 0 0	rts.	May, 1899	2 16 3	2 18 9
Cape Copper, S. Africa	300,000	2 0 0	1 0	June, 1903	2 10 0	2 12 6
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	June, 1903	2 12 6	2 17 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	8 0	Aug., 1899	6 5 0	6 10 0
Crown Reef, g., Transvaal	120,000	1 0 0	4 0	June, 1903	16 10 0	17 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	Mar., 1903	19 10 0	19 12 6
De Beers Con., def.	1,000,000	2 10 0	12 6	Mar., 1903	20 15 0	20 17 6
East Rand, Prop, Transvaal	970,000	1 0 0	5 0	June, 1903	7 1 3	7 3 9
Ferreira g., Transvaal	90,000	1 0 0	2 0	May,. 1903	21 0 0	21 10 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	6 0	June, 1903	6 5 0	6 7 6
Geduld, g, Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 15 0	6 17 6
Henry Nourse, g., Transvaal	125,000	1 0 0	8 0	Feb., 1903	9 2 6	9 7 6
Jagersfontein, d., Orange F. S.	200,000	5 0 0	6 0	Nov., 1899	29 12 6	28 17 6
Jubilee, g., Transvaal	50,000	1 0 0	5 0	June, 1903	5 2 6	5 7 6
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 12 6	3 17 6
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 1 3	4 3 9
May Con., g., Transvaal	288,750	1 0 0	3 0	July, 1903	4 3 9	4 6 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1903	5 7 6	5 12 6
Modderfontein, g., Transvaal	200,000	1 0 0	rts.	Apr., 1902	9 18 9	10 1 3
*Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1902	2 15 0	3 0 0
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Feb., 1903	3 16 3	3 17 6
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	June, 1902	10 5 0	10 6 3
Robinson, g., Transvaal	750,000	5 0 0	5 6	Aug., 1903	10 10 0	10 12 6
Robinson Deep, g., Transvaal	950,000	1 0 0	5 0	May, 1899	4 13 9	4 16 3
Rose Deep, Transvaal	425,000	1 0 0	2 0	Feb. 1903	8 12 6	8 17 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 7 5	2 12 6
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1898	19 6	1 0 0
Village Main Reef, Transvaal	400,000	1 0 0	5 0	Oct., 1902	8 2 6	8 7 6
Wemmer, Transvaal	80,000	1 0 0	5 0	May, 1903	11 15 0	12 5 6

c.—Copper. d.—Diamonds. g.—Gold l.—Lead. s.—Silver. *Ex-Dividend.

LONDON. (*By Cable*).*

Name of Company.	June 23. £.	s.	d.	June 30. £.	s.	d.
Anaconda	4	5	0	4	5	0
British South Africa	2	15	0	2	15	0
Camp Bird	1	10	0	1	10	0
Con. Gold-Fields	6	18	9	7	5	0
De Beers Con. def	19	17	6	20	10	0
East Rand	7	7	6	7	13	9
El Oro, Mex	1	13	1¾	1	15	0
Jagersfontein	30	0	0	30	0	0

Name of Company	June 23. £.	s.	d.	June 30. £.	s.	d.
Johannesburg Invest	3	0	0	3	2	6
Modderfontein	9	19	9	10	6	3
Rand Mines	10	2	6	10	13	9
Rio Tinto com	45	5	0	47	12	6
Simmer & Jack	1	9	4½	1	10	0
Tomboy	1	16	3	1	18	9

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. June 18.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. C Fr.
Boleo	Lower Cal.	Copper		500	176.00	1,360.00	1,366.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.50	18.50
Fraser River	Brit. Col'mb.	Gold	250,000	25		6.50	6.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	93.75	92.75
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	336.00	341.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	440.50	473.00
Nickel	N. Caled'nia	Nickel	16,000,000	250	22.50	462.00	464.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1		7.75	7.75
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	647.00	663.00

TORONTO, ONT.* June 27.

Name of Company.	par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.05	.03	4,500
Cariboo (Mc. K.)	1	.14	.10½	
Cariboo (Hyd.)	1	.75		
Center Star	1	.30	.27	
Crows Nest, C.	100	400	300	
Dominion Coal, com.	100	.98	90	25
Dominion S. & I.	100	.18⅛	.16¾	
Dominion S. & I., pref.	100			
Fairview	1	.03¾	.04⅛	
Giant	1	.04	.02	2,000

Name of Company	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter	$10	500	460	
Mountain Lion	1	.28	.20	
North Star	1	.14	.10½	
Nova Scotia Steel, com	100	.98	.89	
Payne	1	.18	.14	
Rambler Cariboo	1	.40	.38	
Republic	1	.05	.02	
St. Eugene	1	.45	.35	
Virtue	1	.08	.05	
War Eagle Con	1	.15	.10	1,500

*Standard Stock and Mining Exchange. Total sales 8,025 shares.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.—UNITED STATES.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1903	Total to Date.	Latest. Date.	Amt.
Acacia, g	Colo..	$1,500,000	1,433,900	$1	$14,380	$57,520	Apr.. 1903	.01
Adams, s. l. c	Colo..	1,500,000	150,000	10		738,500	Oct.. 1902	.05
Aetna Con., q	Cal....	500,000	100,000	5		225,000	Apr.. 1900	.15
Alaska-Mexican, g	Alaska.	1,000,000	180,000	5	36,000	501,383	Apr.. 1903	.10
Alaska-Treadwell, g	Alaska.	5,000,000	200,000	25	230,000	5,050,000	Apr.. 1903	3.00
Amalgamated, c	Mont..	155,000,000	1,538,879	100	1,538,880	21,195,540	May.. 1903	.75
Am. Sm. & Ref., pf	U. S....	50,000,000	500,000	100	2,825,000	11,516,553	July.. 1903	.50
Anaconda, c	Mont..	30,000,000	1,200,000	25	600,000	22,650,000	May.. 1903	1.75
Annie Laurie, g	Utah...	5,000,000	50,000	100	175,000	235,000	July.. 1903	.50
Arizona, c	Ariz..	3,775,000			501,534	3,947,032	Feb.. 1903	1.00
Atlantic, c	Mich..	1,000,000	40,000	25		940,000	Feb.. 1901	.....
Bald Butte, g. s	Mont..	250,000	250,000	1	15,000	1,312,148	Jan.. 1903	2.00
Boston & Colo. Sm	Colo..	750,000	15,000	50		402,357	Oct.. 1902	.06
Boston Gold-Copper Sm	Colo..	1,000,000	1,000,000	1		150,000	Nov.. 1901	.75
Boston & Mont. Con., c. s. g	Mont..	3,750,000	150,000	25	800,000	27,725,000	Apr.. 1903	2.00
Breece, l. s	Colo..	5,000,000	200,000	25	10,000	200,000	June. 1903	.05
Bunker Hill & Sullivan	Idaho..	3,000,000	300,000	10	54,000	1,496,000	June. 1903	.03
Butte & Boston, c	Mont..	2,000,000	200,000	10		1,800,000	Nov.. 1901	3.00
Butterfly-Terrible, g	Colo..	1,500,000	1,250,000	1		31,250	Oct.. 1901	.00½
C. K. & N, g	Colo..	1,500,000	1,431,900	1	28,638	42,957	June. 1903	.01
Calumet & Hecla, c	Mich..	2,500,000	100,000	25	1,500,000	81,350,000	June. 1903	10.00
Camp Bird, g	Colo..	5,000,000	820,000	5	156,700	578,100	July.. 1903	.15
Carisa g. s. c	Utah..	500,000	500,000	1		30,000	Nov.. 1901	.03
Centennial Eureka, g. s. l. c	Utah..	5,000,000	100,000	25		2,667,700	Jan.. 1902	.50
Center Creek, l. z	Mo....	1,000,000	100,000	10		80,000	Mar.. 1902	.10
Central Eureka, g	Cal....	4,000,000	398,425	10		177,279	Dec.. 1902	.02
Central, l	Mo....	1,000,000	10,000	100	30,000	355,000	June. 1903	.50
Champion, c	Mich..	2,500,000	100,000	25	100,000	105,000	May.. 1903	1.00
Chippewa Con., g. s. l	Colo..	150,000	150,000	1		2,500	Dec.. 1902	.00½
Con. Mercur, g	Utah..	5,000,000	1,000,000	5	150,000	1,000,000	May.. 1903	.03
Continental, z	Mo....	550,000	22,000	25	17,600	35,200	Apr.. 1903	.40
Cripple Creek, g pf	Colo..	125,000	125,000	1		45,000	Jan.. 1902	.04
Croesus, g	Cal....	1,000,000	200,000	5		227,300	Aug.. 1901	.05
Dalton & Lark, g. s. l	Utah..	2,500,000	2,500,000	1		350,000	July.. 1901	.10½
Daly West,	Utah..	3,600,000	180,000	20	648,000	2,907,000	June. 1903	.80
De Lamar, g. s	Idaho..	400,000	67,181	5		2,708,084	Oct.. 1902	.48
Doctor-Jack Pot Con., g	Colo..	3,000,000	2,900,000	1		232,000	Aug.. 1901	.01
Doe Run, l	Mo....	1,500,000	15,000	100	45,000	582,072	Apr.. 1903	1.50
Ducktown c. i. sul. (Ord)	Tenn..	374,000	74,800	5		165,250	Dec.. 1901	.25
Ducktown (Fndr)	Tenn..	1,000	200	5		75,250	May.. 1901	75.00
Elkton Con., g	Colo..	3,000,000	2,500,000	1		1,404,461	Mar.. 1902	.04
Empire State-Idaho, l. s	Idaho..	6,000,000	505,542	10	173,939	1,738,601	July.. 1903	.05
Free Coinage, g	Colo..	1,000,000	10,000	100		160,000	Dec.. 1902	.20
Gemini	Utah..	500,000	5,000	100	100,000	950,000	June. 1903	10.00
Gold Coin of Victor, g	Colo..	1,000,000	1,000,000	1	10,000	1,230,000	Jan.. 1903	.01
Gold King, g	Colo..	1,000,000	936,850	1	46,842	459,056	July.. 1903	.03
Golden Argus, g	Cal....	800,000	8,000	100		2,000	Dec.. 1902	.25
Golden Cycle, g	Colo..	2,000,000	1,600,000	1	202,500	258,750	June. 1903	.03
Golden Eagle g	Colo..	500,000	489,015	1		98,916	Sept.. 1901	.01
Good Hope, g. s	Colo..	50,000	500	100	12,500	12,500	Jan.. 1903	25
Grand Central, g	Utah..	250,000	250,000	1	100,000	731,250	June. 1903	.10
Gwin, g	Cal....	1,000,000	100,000	10		426,500	Dec.. 1902	.15
Hecla, s. l	Idaho..	250,000	1,000,000	½	20,000	120,000	June. 1903	.02
Hecla Con., s. l	Mont..	1,500,000	30,000	50		2,930,550	Apr.. 1903	.25
Homestake, g	S. D....	21,840,000	218,400	100	327,900	12,039,750	June. 1903	.25
Horn Silver, g. s. c. z. l	Utah..	10,000,000	400,000	25		5,342,000	Dec.. 1901	.10
Independence Con., g	Colo..	2,500,000	2,500,000	1		281,375	Apr.. 1901	.04
Ingham Con., g	Colo..	750,000	1,359,600	½		33,981	Aug.. 1901	.00¼
International Nickel, pf	U. S....	12,000,000	87,415	100	349,660	349,660	May.. 1903	4.00
Iowa, g. s. l	Colo..	1,666,667	1,666,667	1	33,334	303,503	Apr.. 1903	.01
Iron Silver	Colo..	10,000,000	500,000	20	100,000	2,750,000	May.. 1903	.10
Isabella, g	Colo..	2,250,000	2,250,000	1		742,500	Mar.. 1901	.01
Jamison g	Cal....	3,900,000	390,000	10	11,700	74,100	Jan.. 1903	.03
Kendall, g	Mont..	2,500,000	500,000	5	24,000	95,000	May.. 1903	.04
Kennedy, g	Cal....	10,000,000	100,000	100		1,801,000	June. 1901	.05
La Fortuna, g	Ariz..	250,000	250,000	1		1,062,500	Oct.. 1902	.05
Last Dollar, g	Colo..	1,500,000	1,500,000	1	30,000	210,000	Mar.. 1903	.02
Liberty Bell, g	Colo..	700,000	139,349	5	39,104	52,139	Apr.. 1903	.15
Lightner, g	Cal....	125,000	102,255	1	15,339	48,689	May.. 1903	.10
Mammoth, g. s. c	Utah..	10,000,000	400,000	25		1,800,000	July.. 1901	.05
Mary McKinney, g	Colo..	1,000,000	1,000,000	1	60,000	530,000	Apr.. 1903	.03
May Day, g	Utah..	100,000	400,000	¼		30,000	Mar.. 1902	.01
Midget, g	Colo..	1,000,000	1,000,000	1		195,000	Apr.. 1902	.15
Mines Co. of America, Finc'l	U. S....	2,000,000	2,000,000	1	150,000	180,000	June. 1903	.01½
Modoc, g. s	Colo..	500,000	500,000	1	5,000	255,000	Jan.. 1903	.01
Mont. Ore Purchasing	Mont..	2,500,000	81,000	25	324,000	2,970,000	June. 1903	2.00
Mountain, c	Cal....	6,250,000	250,000	25		3,633,750	Nov.. 1902	.98
Mine La Motte, l	Mo....	3,000,000	300,000	10	120,000	120,000	Apr.. 1903	.20
Napa Con., q	Cal....	700,000	100,000	7		1,180,000	Oct.. 1902	.10
National Lead, com	U. S....	15,000,000	149,054	100		1,341,486	Mar.. 1900	1.00
National Lead, pfd	U. S....	15,000,000	149,040	100	521,640	13,448,528	June. 1903	1.75
New Idria, q	Cal....	5,000,000	100,000	5	60,000	480,000	Apr.. 1903	.30
New Jersey, z	U. S....	10,000,000	100,000	100	300,000	5,100,000	Feb.. 1903	3.00
New Leadville Home, g	Colo..	2,000,000	2,000,000	1		265,500	Feb.. 1902	.00½
Nugget, g	Colo..	1,000,000	991,000	1		84,730	July.. 1901	.01
Ontario, s. l	Utah..	15,000,000	150,000	100		14,917,000	Dec.. 1902	.30
Osceola, c	Mich..	2,500,000	96,150	25		4,247,300	Dec.. 1901	3.00
Parrot, c	Mont..	2,300,000	229,850	10		5,772,925	Jan.. 1902	.50
Pioneer, g	Alaska.	5,000,000	50,000	100		300,000	Dec.. 1872	6.00
Pointer, g	Colo..	1,250,000	1,250,000	1		25,000	June. 1901	.01
Portland, g	Colo..	3,000,000	3,000,000	1	180,000	4,477,080	Apr.. 1903	.05
Pride of the West	Ariz....	1,500,000	150,000	10		15,000	Oct.. 1902	.10
Quicksilver, pfd	Cal....	4,300,000	43,000	100	21,500	1,931,411	May.. 1903	.50
Quincy, c	Mich..	2,500,000	100,000	25	250,000	13,820,000	Feb.. 1903	2 50
Rob Roy, z	Mo....	15,000	13,725	1	1,235	1,483	May.. 1903	.05
Rocco-Homestake-Nevada, l. s	Nev....	300,000	240,000	1		90,000	Nov.. 1902	.01
Sacramento, g	Utah..	5,000,000	1,000,000	5	30,000	163,000	June. 1903	.00½
St. Joseph, l	Mo....	6,000,000	375,000	10	112,500	3,722,000	June. 1903	.15
Silver Hill, g. s	Nev....	180,000	180,000	1	9,000	19,800	Mar.. 1903	.05
Silver King, g. s. l	Utah..	3,000,000	150,000	20	600,000	6,650,000	June. 1903	.65½
Smuggler, s. l. z	Colo..	1,000,000	1,000,000	1		2,175,000	Feb.. 1901	.01
Spearfish, g. pf	So. Dak	1,000,000	882,000	1	44,100	61,740	June. 1903	.01
Specie Payment, g	Colo..	1,000,000	1,000,000	1		40,190	Oct.. 1902	.0
Standard Con., g. s	Cal....	2,000,000	178,394	10	35,678	4,142,492	May.. 1903	.10
Standard, c	Ariz....	500,000	490,000	1	20,000	20,000	June. 1903	.02½
Standard, s. l	Idaho..	500,000	500,000	1	150,000	2,870,000	June. 1903	.05
Stratton's Independence, g	Colo..	5,500,000	1,000,007	5		3,635,271	Jan.. 1902	.12
Swansea, s. l	Utah..	500,000	100,000	5		330,500	June 1901	.05
Syndicate, g	Cal....	100,000	100,000	1		82,000	Aug.. 1902	.02
Tamarack, c	Mich..	1,500,000	60,000	25		8,490,000	Dec.. 1901	10.00
Tomboy, g. s	Colo..	1,500,000	300,000	5		1,244,000	July.. 1902	.24
Town Topics, g. c	Colo..	1,000,000	1,000,000	1	10,000	45,000	June 1903	.00½
Trimountain, c	Mich..	2,500,000	100,000	25	300,000	300,000	June. 1903	1 50
Trinity County, g	Cal....	1,000,000	100,000	10	35,000	35,000	July.. 1903	.05
United, (Creede) g	Colo..	500,000	500,000	1	10,000	45,000	May.. 1903	.02
Union, g	Colo..	1,250,000	1,250,000	1		445,244	Jan.. 1902	.02
United, c, pf	Mont..	5,000,000	50,000	100	150,000	300,000	May.. 1903	3.00
United, g	Colo..	5,000,000	3,994,789	5	40,091	319,933	Jan.. 1903	.01
United, z. l., com	Mo....	5,000,000	78,999	5	7,764	22,961	Apr.. 1903	.05
United, z. l., pfd	Mo....	1,000,000	18,998	25	17,040	99,095	Apr.. 1903	.50
United Verde, c	Ariz....	3,000,000	300,000	10	675,000	13,710,322	June. 1903	.75
U. S. Red. & Ref., com	Colo....	6,000,000	59,188	100	177,564	354,740	June. 1903	1.00
U. S. Red. & Ref., pf	Colo....	4,000,000	39,458	100	177,561	413,634	June. 1903	1.50
Utah, g	Utah..	1,000,000	100,000	10	10,900	217,000	May.. 1903	.02
Utah Con., c	Utah..	1,500,000	300,000	5	504,000	1,233,000	Jan.. 1903	1.68
Vindicator Con., g	Colo..	1,500,000	1,100,000	1	110,000	1,027,000	Apr.. 1905	.05
Waldorf, g	Colo..	3,000,000	3,000,000	1		25,000	Dec.. 1902	.00½
Wasp No. 2, g	S. Dak.	500,000	147,900	1		218,410	June. 1902	.00½
White Rock, g	Nev....	500,000	200,000	2½		2,000	Aug.. 1902	.01
Wolverine, c	Mich..	1,500,000	60,000	25	150,000	1,050,000	Apr.. 1903	2.50
Yankee Con., g. s. l	Utah..	500,000	500,000	1		75,000	Apr.. 1902	.05
Yellow Aster, g	Cal....	1,000,000	100,000	10	60,000	533,789	June. 1903	.20

NOTE.—These dividends are published gratuitously. Readers are invited to send any corrections or additions which they think necessary to complete our list.

COAL, IRON AND INDUSTRIALS.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1903.	Total to Date.	Latest. Date.	Amt.
Ala. Con., Coal & Iron, pfd	Ala....	$2,500,000	$24,638	$100	$36,234	$803,646	June. 1903	$1.75
Ala. & Ga. Iron, pf		650,000	6,500	100	6,500	6,500	Jan.. 1903	1.00
Allis-Chalmers, pfd	U. S....	25,000,000	200,000	100	568,750	2,659,375	May.. 1903	1.75
Alma Oil	Cal....	400,000	380,000	1	22,800	22,800	June. 1903	.03
Altoona Coal & Coke Co	Pa....	2,500,000	250,000	10		75,000	Jan.. 1901	.30
Amer. Agr. Chem., pfd	U. S....	30,000,000	181,350	100	544,050	4,126,710	Apr.. 1903	3.00
American Cement	Pa....	2,100,000	200,000	10	240,000	620,000	July.. 1903	.40
American Coal	Md....	1,500,000	60,000	25	75,000	1,357,500	Mar.. 1903	1.25
American Iron & Steel, com	Pa....	17,000,000	34,000	50		256,100	May.. 1902	.15
American Iron & Steel, pfd	Pa....	3,000,000	60,000	50	75,000	525,000	Apr.. 1903	.62½
American Steel Foundries, pfd	U. S....	15,500,000	155,000	100	465,000	697,500	June. 1903	1.50
Aztec Oil	Cal....	250,000	235,000	1	9,400	25,850	May.. 1903	.03
Cambria Steel	Pa....	50,000,000	900,000	50	675,000	5,775,000	Feb.. 1903	.75
Central Coal & Coke, com	Mo....	5,125,000	51,250	100	230,625	474,375	July.. 1903	1.50
Central Coal & Coke, pfd	Mo....	1,875,000	18,750	100	70,311	773,435	July.. 1903	1.25
Central Oil	W.Va..	1,500,000	60,000	25	15,000	137,500	May.. 1903	.25
Central Oil	Cal....	1,000,000	800,000	1		160,247	Jan.. 1902	.03
Colorado Fuel & Iron, com	Colo....	38,000,000	239,310	100		1,642,500	Apr.. 1902	1.75
Colorado Fuel & Iron, pfd	Colo....	2,000,000	20,000	100	80,000	1,560,000	Feb.. 1903	4.00
Columbus & Hocking C. & I	Ohio....	7,000,000	69,220	100	34,610	69,220	Mar.. 1903	.50
Consolidation Coal	Md....	10,250,000	102,500	100	205,000	6,536,650	Jan.. 1903	2.00
Consolidated Coal	Ill....	5,000,000	50,000	100		160 000	Jan.. 1902	1.00
Crucible Steel, pfd	U. S....	25,000,000	250,000	100	875,000	4,812,500	June. 1903	1.75
Cummings Cement	N. Y....	300,000	3,000	100		189,000	July.. 1902	9.00
Dixon, Joseph, Crucible	N. J....	1,000,000	7,345	100	14,690		Apr.. 1903	1.00
Empire Steel & Iron, pfd	U. S....	5,000,000	23,700	100	35,550	355,442	Jan .. 1903	1.50
Four Oil	Cal....	300,000	208,700	1	10,435	37,566	June. 1903	.01
General Chem., com	U. S....	12,500,000	74,103	100	185,258	1,115,279	June. 1903	1.25
General Chem., pfd	U. S....	12,500,000	100,000	100	441,240	2,416,418	July.. 1903	1.50
George's Creek Coal & Iron	Md....	2,500,000	22,000	100	33,000		Jan.. 1903	3.00
Giant Oil	Cal....	500,000	500,000	1	5,000	5,000	Jan.. 1903	.01
Hanford Oil	Cal....	20,000	2,000	10		13,000	Sept. 1902	1.50
Heywood Oil	Tex....	800,000	800,000	1	16,000	144,000	Jan.. 1903	.02
Higgins Oil	Tex....	2,500,000	17,600	100		96,850	Apr.. 1902	1.50
Home Oil	Cal....	100,000	100,000	1	42,500	492,500	June. 1903	.05
Homestake Oil	Cal....	100,000	10,000	10		33,000	Aug.. 1902	.15
Houston Oil, pfd	Tex....	7,500,000	75,000	100	224,125	806,500	Feb.. 1903	3.00
Imperial Oil	Cal....	1,000,000	100,000	100	140,000	400,000	July.. 1903	.20
Int'l Acheson Graphite, pfd	N. Y....	500,000	5,000	100	17,500	87,500	Feb.. 1903	3 50
Jeff. & Clearf., Coal & Iron, com	Pa....	1,500,000	15,000	100		105,000	Aug.. 1902	5.00
Jeff. & Clearf., Coal & Iron, pfd	Pa....	1,500,000	15,000	100	37,500	563,040	Feb.. 1903	2.50
Lehigh Coal & Nav	Pa....	14,346,850	286,933	50	286,933	29,382,053	May.. 1903	1.00
Maryland Coal, pfd	Md....	2,000,000	18,850	100	65,975	951,385	July.. 1903	3.50
Monongahela R. Coal, pfd	Pa....	10,000,000	88,300	50	347,165	2,777,180	Jan.. 1903	3.50
Monte Cristo Oil	Cal....	500,000	500,000	1	20,000	20,000	May.. 1903	.01
National Carbon, pf	U. S....	4,500,000	45,000	100	157,500	1,417,500	May.. 1903	1.75
Ohio & Indiana Natural Gas	U. S....	10,000,000	90,000	100	180,000	1,260,000	June. 1903	1.00
Pacific Coast Borax	Cal....	2,000,000	19,000	100	114,000	1,331,500	June. 1903	1.00
Peerless Oil	Cal....	1,000,000	92,000	10	66,240	113,520	June. 1903	.14
Pennsylvania Salt Mfg	Pa....	5,000,000	100,000	50	150,000	13,300,000	Apr.. 1903	3.00
Penna. Steel of N. J	Pa....	25,000,000	168,214	100	588,750	2,917,000	May.. 1903	3.50
Philadelphia Gas, com	Pa....	16,102,131	308,542	50	694,218	3,185,425	Aug.. 1903	.75
Philadelphia Gas, pfd	Pa....	3,998,350	212,873	50	99,959	906,108	Mar.. 1903	1.25
Pittsburg Coal, pfd	Pa....	32,000,000	297,012	100	1,039,542	7,276,794	Apr.. 1903	1.75
Pittsburg Oil	Cal....	300,000	220,000	1	18,000	18,000	June. 1903	.02½
Rep. Iron & Steel, pfd	U. S....	25,000,000	203,589	100	1,068,738	5,633,032	July.. 1903	1.75
Retsof Salt	N. Y....	5,000,000	36,000	100	72,000	648,000	Apr.. 1903	1.00
San Joaquin Oil	Cal....	100,000	100,000	1	10,000	70,000	Apr.. 1903	.05
Shelby Iron	Ala....	1,000,000	10,000	100	10,000	700,000	May.. 1903	10.00
Sloss-Sheffield Steel & Iron, pfd	Ala....	20,000,000	65,085	100	342,000	1,596,000	July.. 1903	1.75
St. Bernard Coal & Coke	Ky-Tenn	1,000,000	10,000	100		770,000	Dec.. 1902	6.00
Standard Oil (of N. J.)	U. S....	100,000,000	970,000	100	26,190,000	190225,000	June. 1903	7.00
Susquehanna I. & S., pfd	Pa....	1,500,000	300,000	5	45,000	717,500	Jan.. 1903	.15
Temple Iron	Pa....	240,000	2,400	100	14,400	21,600	July.. 1903	3.00
Tenn. C. I. & R. R., com	Tenn..	23,000,000	225,536	100		1,102,144	Nov.. 1900	2.00
Tenn. C. I. & R. R., pfd	Tenn..	248,000	2,480	100	9,920	297,135	May.. 1903	2.00
Tex. & Pacific Coal	Tex....	2,000,000	20,000	100	60,000	2,100,000	Apr.. 1903	1.50
Thirty-three Oil	Cal....	500,000	100,000	5	60,000	180,000	June. 1903	.10
Thomas Iron	Pa....	2,500,000	25,000	100		200,000	Aug.. 1902	4.00
Tidewater Steel, pfd	Pa....	600,000	60,000	1	18,000	18,000	Jan.. 1903	.30
Union Oil	Cal....	10,000,000	52,672	100	36,870	334,465	Jan.. 1903	.70
U. S. Steel Corp., com	U. S....	550,000,000	5,083,025	100	10,166,050	45,726,552	June. 1903	1.00
U. S. Steel Corp., pfd	U. S....	550,000,000	5,102,811	100	17,859,838	80,332,910	May.. 1903	1.75
Va.-Carolina Chem., com	U. S....	38,000,000	279,844	100	699,610	3,678,869	June. 1903	1.25
Va.-Carolina Chem., pfd	U. S....	12,000,000	120,000	100	720,000	6,780,000	July.. 1903	2.00
Victoria Coal & Coke, com	W. Va..	150,000	1,500	100		15,000	Jan.. 1901	10.00
Victoria Coal & Coke, pfd	W. Va..	100,000	1,000	100		15,000	July.. 1902	3.00
Westmoreland Coal	Pa....	5,000,000	250,000	50	375,000	7,875,000	Apr.. 1903	1.50
West Shore Oil	Cal....	100,000	100,000	1	35,000	80,000	July 1903	.05

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par al	Dividends. Paid 1903.	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia	Mex..	$480,000	9,000	$50	$41,868	$120,898	Apr.. 1903	$2.62
Barreno	Mex..		2,400	....	10,396	53,946	June. 1903	.86
Bartolome de Medina Mill	Mex..	50,000	2,000	25	8,225	71,808	June. 1903	.65
Buena Vista, g. s	Mex..	100,000	1,000	100	5,000	5,000	June. 1903	5.00
Butler's Salvador	Salv..	750,000	150,000	5	36,000	36,000	May.. 1903	.24
Cariboo McKinney, g	B. C..	1,250,000	1,250,000	1		496,837	Mar 1902	.01½
Center Star, g	B. C..	3,500 000	3,500,000	1		210,000	May . 1901	.01
Cinco Senores	Mex..		2,000	....	47,670	703,735	June. 1903	4.30
Copiapo, c	Chile..	1,125,000	112,500	10	39,900	2,865,900	Feb.. 1903	.36
Dolores, g. s	Mex..	100,000	100,000	1	25,000	25,000	Jan.. 1903	.25
Dominion Iron & Steel, pf	N. S....	5,000,000	50,000	100	175,000	700,000	Apr.. 1903	3.50
Dominion Coal, pf	N S....	3,000,000	30,000	100	180,000	2,340,000	July.. 1903	2 00
Dos Estrellas	Mex..	150,000	3,000	50	183,150	408,150	July.. 1903	12.30
El Oro, g. s	Mex..	5,000,000	1,000,000	5		1,886,100	Dec.. 1902	.36
Esperanza, s. g	Mex..	150,000	3,000	50	58,620	1,128,699	June. 1903	4.20
Frontino & Bolivia, c	Colom.	643,310	128,662	5		1,211,703	July.. 1901	.72
Goodenough, s. l	B. C..	800,000	659,400	1		13,198	Jan.. 1902	.01
Greene Con., c	Mex..	7,200,000	720,000	10	432,000	852,000	May.. 1903	.20
Guadalupana	Mex..	15,000	3,000	5	4,620	67,620	Feb.. 1903	.77
Guadalupe Mill	Mex..	1,000,000	10,000	100	30,800	1,515,750	Apr.. 1903	.77
Le Roi, g	B. C..	5,000,000	200,000	25		1,305,000	Nov . 1899	1.20
Le Roi No. 2, g	B. C..	3,000,000	120,000	25		288,000	May . 1902	1.20
Mesquital	Mex..	125,000	250,000	½	15,000	51,458	Feb.. 1903	.06
Metalurgical Co., of Torreou	Mex..	1,500,000	30,000	50	269,500	269,500	Apr. 1903	8.98
Natividad, s. g	Mex..	36,000	2,400	15	40,800	204,428	June. 1903	4.30
N. Y. & Hond. Rosario, s. g	C. A..	1,500,000	150,000	10	90,000	1,940,000	June. 1903	.10
North Star, s. l	B. C..	1,500,000	1,300,000	1		581,356	Dec. 1902	.01
Nova Scotia St. & Coal, com	N. S....	5,000,000	41,200	100	123,600	391,400	Apr.. 1903	1.00
Nova Scotia St. & Coal, pfd	N. S....	2,000,000	10,300	100	61,800	185,400	July.. 1903	2.00
Providencia (S. J.)	Mex..	90,000	6,000	15	13,860	174,360	Mar.. 1903	.77
Rambler-Cariboo, s. l	B. C..	1,250,000	1,250,000	1		220,000	Nov. 1902	.01½
Real del Monte	Mex..		2,554	....	9,833	2,883,083	Feb.. 1903	3.85
St. John del Rey, g	Brazil.	3,000,000	546,265	5	87,402	14,093,397	June. 1903	.16
Soledad, s. l	Mex..	19,200	960	20	17,319	239,560	June. 1903	4.30
Sorpressa	Mex..	19,200	960	20	3,852	189,505	May . 1903	2.10
Sta. Maria de Guadalupe	Mex..	2,500	2,500	1		377,918	Sept. 1902	4.06
Sta. Maria de la Paz	Mex..		2,400	....		1,848,273	Dec.. 1902	7.65
San Francisco Mill	Mex..	50,000	6,000	25		284,760	Nov . 1902	.40
Sta. Gertrudis	Mex..	1,920,000	38,400	50	83,832	2,731,176	June. 1903	....
San Rafael	Mex..	60,000	2,400	25	64,844	1,837,912	June. 1903	....
Union Mill	Mex..	150,000	3,000	50	11,325	395,795	Apr.. 1903	1.90
Ymir, g	B. C..	1,000,000	200,000	5		288,000	Mar . 1902	.24

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHCLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—	Cust.	Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F.FF.FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09½
Mont. car-lots, f.o.b., Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg.ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh.ton		25.00@35.00
Pumice Stone, Am. Powd	lb.		.01⅝@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04½
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg.	"		.07
ACIDS—			
Boracic, crystals	"		.10¾@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		.95
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.05½
AMMONIUM—			
Carbonate, lump	"		.07½
Powdered	"		.08¼
Muriate	"		.05⅝
Lump	"		.09
Nitrate, white pure (99%).	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.05½@.06
Powdered, ordinary	"		.05⅝@.07¼
Oxide, com'l white, 95%	"		.09½
Com'l white, 95%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.03@.03½
Red	"		.06½@.06¾
ASPHALTUM—			
Ventura, Cal.	sh.ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21.00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh.ton		25.00@27.50
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05¾

BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.01⅞
BARYTES—			
Am. Crude, No. 1	sh.ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign, gray	"		13.50
Snow white	"		17.00
Floated	"		19.00
BAUXITE—Ga. or Ala. Mines:			
First Grade	lg.ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMINE—Bulk.	"		.40@.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh.ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs	"		.80
Slag cement, imported	"		1.65
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh.ton		3.25
Ppt. per quality	lb.		.04¼@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE—			
(50% ch.) ex-ship N. Y.	lg.ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg.ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh.ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide—Black	"		2.50@2.65
Gray	"		2.52@2.75
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—in bulk	100 lbs.		.47½
In bbls	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25 lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro, (32-2-10° Be.)	"		.13¼@.13⅞
FELDSPAR—Ground	sh.ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg.ton		14.75
French, Best	"		11.75
FLUORSPAR—			
Am. lump, 1st grade	sh.ton		14.40
2d grade	"		13.90
Gravel and crushed, 1st gr	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.90
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80

GRAPHITE—Am. f.o.b. Providence, R. I., lump	Cust. sh.ton	Meas.	Price. $8.00
Pulverized	"		30.00
Am., pulverized other than R. I., f.o.b. N. Y.	"		45.00
Best flake	"		150.00
German, com. pulv.	lb.		.01¼@.01½
Best pulverized	"		.01½@.02
Ceylon, common pulv.	"		.02¾@.03½
Best pulverized	"		.04@.08
Italian, pulv	"		.01¼
GYPSUM—Ground	sh.ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg.ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color.	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh.ton		17.50@18.00
Bricks best imp., f.o.b., N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		160.@200.
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—Powdered, 70@75% binoxide	lb.		.01¼@.01½
Crude pow'd. 75@85% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh.ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse.	sh.ton		33.00@38.00
Fine	lb.		.00⅞@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in.	"		.80
3x4 in.	"		1.50
4x4 in.	"		2.00
6x6 in.	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh.ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.: 25@30, cold test	gal.		.13@.13½
15, cold test	"		.13½@.14
Zero	"		.18@.18½
Summer	"		.12½@.13
Cylinder, dark steam ref.	"		.14½@.15
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.20
Extra cold test	"		.25@.31
Gasoline, 86°@90°	"		.16@.21
Naphtha, crude, 68°@72°	bbl.		11.20
"Stove"	gal.		.14½
Linseed, domestic raw	"		.37@.40
Boiled	"		.44
Calcutta, raw	"		.75
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05⅝@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06¼@.08¼

PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh.ton		$19.00
Red	"		16.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04⅝
French, washed	"		.01½@.01⅞
Orange mineral, Am.	"		.08½@.08⅝
Foreign, as to make	"		.08½@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.08
Turpentine, spirits	gal.		.49½ @.50
White lead, Am., dry	lb.		.05½@.05⅝
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex dry	"		.04⅝@.04⅝
Foreign, red seal, dry	"		.06@.08½
Green seal, dry	"		.06½@.09½
POTASH			
Caustic, ordinary	"		.04½@.04⅞
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am.	"		.08½@.08¼
Scotch	"		.08½@.09
Bromide	"		.25@.38
Carbonate (80@85%)	"		.03½@.04⅝
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07¼
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg.ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95%	"		1.86
Permanganate	lb.		.09½@.09⅝
Prussiate, yellow	"		.13¼@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh.ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.35
Refined	"		4.00@4.50
SILICA—Best foreign	lg.ton		10.00@11.00
Ground quartz, ord.	sh.ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.33¼
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ordinary, f.o.b. w'ks	100 lbs.		1.25
Extra domes, f.o.b. w'ks	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¼
Carbonated ash, high test, in bags, f.o.b. works.	100 lbs.		.75@.85
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@78%, f.o.b. w'ks	"		1.65@1.70
Foreign, f.o.b. N. Y.	"		1.90@2.00
Chlorate, com'l	"		.07¼@.07¾
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		1.95@2.00
Peroxide	lb.		.45
Phosphate	"		.02½@.02¼
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.03
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¼
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh.ton		18.00
N. Y., Fibrous, best	"		10.20
French, best	100 lbs.		2.00
Italian, best	"		2.37½
TAR—Regular	bbl.		2.40
Oil barrels	"		4.40
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¼
Carbonate, ppt.	"		.09
Chloride solution, com'l	"		.02¼
Chloride granular	"		.04¼@.04⅝
Dust	"		.04⅝@.04¼
Sulphate	"		.02½@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07⅞@.08¼
THORIUM—Nitrate 49@50%	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.